

Coastal Observation Programme — Engineering (C.O.P.E.)

Point Vernon — City of Hervey Bay

For the years 1977 to 1988



**Beach Protection
Authority
Queensland**

March 1993

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PO Box 155
BRISBANE ALBERT STREET
QLD 4002
AUSTRALIA

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Abstract

This report provides a summary of primary analyses of C.O.P.E. data on wind, wave and beach processes observed at Point Vernon in the City of Hervey Bay, on the south Queensland coast. The data was recorded by volunteer observers during the period March 1977 to November 1988. The Beach Protection Authority wishes to thank all observers in the recording of data at the C.O.P.E. Station. The information published is considered representative of the long term conditions. The station was closed in November 1988.

Others available in this series

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- Hull Heads — Cardwell Shire, (Report 26.1)
- Trinity Beach — Mulgrave Shire, (Report 27.1)
- Buddina Beach — City of Caloundra, (Report 28.1)

References

1. Robinson, D.A. and Jones, C.M.
Queensland Volunteer Coastal Observation Programme - Engineering (C.O.P.E.).
3rd Australian Conference on Coastal and Ocean Engineering, Melbourne, April 1977.
2. Patterson, D.C. and Blair, R.J.
Visually Determined Wave Parameters.
6th Australian Conference on Coastal and Ocean Engineering, Gold Coast, July 1983.
3. Beach Protection Authority Queensland
Hervey Bay Beaches.
A Detailed Study of Coastline Behaviour Along the Mainland Beaches of Hervey Bay, South-East Queensland, Australia.
4. Andrews M.J. and Blair R.J.
Coastal Observation Programme - Engineering (C.O.P.E.).
Beach Conservation No. 69 June 1990.

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1.0 Introduction

1.1 The programme

The Beach Protection Authority requires basic data on the behaviour of Queensland's beaches in order to provide well founded advice on coastal management to Local Authorities. The C.O.P.E. project aims to collect information on wind, waves and beach behaviour in areas where extensive investigations are not practical and where otherwise little or no data exist.

The project is based on the recruitment of volunteer observers who are prepared to record a series of basic parameters daily for at least a three year period.

1.2 Site selection

In selecting a site for a C.O.P.E. station, consideration is given to:

- (a) the general shoreline configuration and the possibility of extrapolation of data to other adjacent beaches;
- (b) the distribution of stations along Queensland's coastline; and
- (c) the need to correlate the C.O.P.E. data with planned or existing data collection programmes.

1.3 Instrumentation

The C.O.P.E. observers are supplied with a basic kit of recording instruments including:

- 30 metre tape, wind meter, stop watch, 2.0 metre measuring sticks, recording forms and fluorescent dye.

1.4 Observers

The majority of C.O.P.E. observers are volunteers, who may be local business people, local residents or school children. Some stations are operated by Government and Local Authority employees who carry out the observations as part of their official duties.

1.5 Accuracy

Individual observers differ in their subjective assessment of the various parameters recorded as part of the C.O.P.E. programme. Wave parameters such as type, height, and angle of approach together with surf zone width and location of the vegetation line all require visual assessment, the accuracy of this assessment will vary from observer to observer and possibly from recording to recording.

Although the Authority is confident that all observers make their observations to the best of their ability and accepts these observations without adjustment, the existence of random and non-random errors in the recorded data is to be expected.

Problems associated with the use of data containing these errors are minimised in two ways. Firstly, regular visits are made to the C.O.P.E. stations by the Authority's C.O.P.E. Field Officer to provide a check on any bias introduced into the recordings by incorrect observation procedures. Secondly, it has been found that, with a large number of observations taken on a regular basis, a reasonable assessment can be made of the average climatologies of the observed parameters provided the observation errors are random. A minimum recording period of three years has been adopted for the analysis and publication of the data. Five day moving averages are applied to observations of the various beach width and foreshore slope parameters to smooth out random errors.

For these reasons, the Authority is of the opinion that published C.O.P.E. data can be used with confidence provided the above inherent limitations are recognised.

1.6 Presentation of data

The purpose of this report is to present C.O.P.E. data for the eleven year period 1977 to 1988 in a useful statistical form. No attempt has been made to interpret the observed data.

If the eleven year period is representative of the long term average meteorological conditions, the statistics presented on wind, wave and beach movements can be regarded as typical. However, this recording period may be considered too short to be representative in terms of the average occurrence of extreme events such as cyclones and floods, and this should be taken into account when consideration is being given to the influence of such events on trends of long term beach behaviour.

2.0 Station particulars

2.1 Location

Point Vernon is a coastal headland located within the City of Hervey Bay and lies approximately 20 kilometres north east of Maryborough on the south Queensland coast. The station is situated on the beach adjacent to the camping reserve in the town of Pialba and is partly sheltered from the Pacific Ocean by Fraser Island. The station was established in conjunction with stations at Urangan and Torquay as part of the Hervey Bay Beaches Investigation. The location of the Point Vernon C.O.P.E. station is shown in Figure 1.1 and 1.2.

2.2 Observers

This station has been operated by Council employee Mr. G. Kruger (1977 - 1983) and Mr A. Brodie (1984 - 1988).

2.3 Supervision of station

The observers were instructed in the recording programme by the C.O.P.E. Field Officer and the initial instruction period was followed up with visits to the station during the period of recordings presented in this report.

2.4 Observed parameters

The observers at this station recorded the morning observation between 8am and 12pm and also recorded afternoon observations between 12.30pm and 6pm.

This station has recorded:

- Wave Period
- Wave Height
- Wave Direction
- Wave Type
- Surf Zone Width
- Presence of Offshore Bar
- Wind Speed
- Wind Direction
- State of Tide
- Longshore Current Speed
- Longshore Current Direction
- Distance from Shoreline to Dye Patch (recorded from January 1986)
- Monthly sand sample

2.5 Tidal information

Tidal information for Point Vernon as presented below.
Datum is Low Water Datum.

M.H.W.S.	3.11 metres
M.H.W.N.	2.52 metres
M.S.L.	1.87 metres
M.L.W.N.	1.24 metres
M.L.W.S.	0.62 metres

A.H.D. is 1.90 metres above Low Water Datum.

Tidal information was obtained from the 1991 Queensland Tide Tables.

2.6 Description of the beach

The beach at the Point Vernon C.O.P.E. Station exhibits the following characteristics:

- Typical beach slopes: Foreshore slope is in the range 1 in 8 to 1 in 10 ($7^\circ - 6^\circ$).
- Beach width: Varied from 20 to 30 metres measured from the seaward toe of the frontal dune to Low Water Mark over the eleven year period (1977 - 1988) as determined by regular aerial photography.
- D50 sand size: 0.36 mm averaged over eleven years (1977 - 1988).
- Adjoining Landform: Low and narrow frontal dune system backed by a levelled hind dune developed as a caravan and camping area.
- Vegetation: The frontal dune supports herbland dominated by sand spinifex grass *Spinifex sericeus* and goat's foot convolvulus *Ipomoea pes-caprae*. Other species present include saltwater couch *Sporobolus virginicus*, green couch *Cynodon dactylon* and young horsetail she-oaks *Casuarina equisetifolia var. incana*.

2.7 Meteorological events

The following cyclones were recorded by the Brisbane Bureau of Meteorology as having tracks within 500 kilometres of Point Vernon between March 1977 and November 1988. It is considered that these meteorological events may have had some effect on the condition of the beach at Point Vernon.

Cyclone Hal	04/05/78 - 12/05/78
Cyclone Gordon	09/01/79 - 11/01/79
Cyclone Kerry	13/02/79 - 05/03/79
Cyclone Paul	03/01/80 - 08/01/80
Cyclone Simon	20/02/80 - 28/02/80
Cyclone Cliff	09/02/81 - 15/02/81
Cyclone Abigail	22/01/82 - 05/02/82
Low Pressure System	03/06/83 - 06/06/83
Cyclone Ingrid	20/02/84 - 25/02/84
Cyclone Lance	04/04/84 - 07/04/84
Low Pressure System	07/04/84 - 13/04/84
Low Pressure System	18/05/84 - 23/05/84
Cyclone Pierre	18/02/85 - 24/02/85
Cyclone Vernon	21/01/86 - 24/01/86
Cyclone Blanch	21/05/87 - 27/05/87

3.0 Data

3.1 General

C.O.P.E. data for this station for the eleven year period March 1977 to November 1988 is presented on the attached figures. The data has been analysed statistically and/or smoothed to reveal long term averages or trends. A brief description of each of the observed parameters is given below with the relevant figure references.

3.2 Wind

The observer recorded the wind speed at the beach using a hand held wind meter at 1.5 metres above beach level. Prior to January 1986 wind direction was estimated to the nearest compass sector. After this time wind direction is recorded in degrees by compass.

A summary of annual wind speed and direction percentage occurrences are shown as a wind rose in Figure 3. Where applicable, morning and afternoon readings as well as the overall average are shown.

Wind speed was recorded in miles per hour (m.p.h.) rather than knots after January 1986. The recordings are converted from (m.p.h.) to knots for Figure 3.

3.3 Waves

The average and maximum breaker height (trough to crest) is usually estimated to the nearest 0.1 metre. From experience the estimate of average breaker height has been found to be comparable with the equivalent deep water significant wave height.

Recordings of maximum wave height and the new method used to obtain wave height were introduced into the programme from January 1986. Wave type and state of tide were discontinued at this time.

The observers estimate the wave period by recording the time taken for eleven wave crests (the duration of 10 waves) to pass a point.

Wave direction was recorded as a compass bearing from January 1986. The direction recorded was then converted to a sector (see the following paragraph regarding sector system).

The wave direction is estimated as one of five direction sectors indicating the angle to the shoreline alignment from which the waves are approaching the beach. These sectors have been selected as:-

Sector 1	-	0°	to	60°
Sector 2	-	61°	to	85°
Sector 3	-	86°	to	95°
Sector 4	-	96°	to	120°
Sector 5	-	121°	to	180°

Note: 0° is the beach alignment to the left of the observer when facing seaward, and at the COPE station this direction is approximately 80° west of true north.

Statistical representations of the observed wave data include:

- (a) the percentage of wave height recordings which exceed any given wave height for all directions combined (Figure 4).
- (b) the percentage occurrence of various combinations of wave heights and periods and directions (Figure 5 and Figure 6).
- (c) surf zone width with an indication of the existence or otherwise of an offshore bar (Figure 7 to Figure 28).
- (d) tabulation of the occurrence of various wave heights, periods, types and directions (Tables 1 to 12).

3.4 Longshore currents

The observer measured the distance parallel to the shoreline that a dye patch in the surf zone moved in one minute. Current direction is either upcoast or downcoast, upcoast being to the left when facing the sea from the beach.

The readings are converted to a velocity which is plotted on a daily basis (Figure 29 to Figure 49). Mean upcoast and downcoast components and the overall annual means are also presented.

3.5 Beach profile parameters

Beach profile parameters were not recorded at this station.

Table 1.

Monthly and annual — Mean wave height/mean wave period and wave type/wave direction occurrences. Point Vernon • No. of Observations: 321 • Year 1977

Month	Non-CALM obs.	Mean wave period (secs)	No. obs.	Mean wave height (metres)	Percentage occurrence — wave type/wave direction												
					Wave type						Wave direction						
					No. obs.	SP	PL	Surge	SP/PL	CALM	No. obs.	1	2	3	4	5	CALM
March	22	6.2	42	0.16	20	-	-	-	-	100.0	42	-	-	50.0	2.4	-	47.6
April	18	7.2	34	0.15	20	10.0	-	-	10.0	80.0	34	-	-	50.0	2.9	-	47.1
May	17	6.2	39	0.12	39	12.8	-	-	30.8	56.4	39	-	-	41.0	2.6	-	56.4
June	16	7.0	36	0.09	36	8.3	-	-	36.1	55.6	36	-	-	44.4	-	-	55.6
July	17	5.7	38	0.09	38	5.3	-	-	39.4	55.3	38	-	-	42.1	2.6	-	55.3
August	20	6.5	39	0.12	39	-	2.6	-	48.7	48.7	39	-	-	46.2	5.1	-	48.7
Sept.	20	4.0	31	0.15	31	3.2	-	-	61.3	35.5	31	-	9.7	45.2	9.7	-	35.4
Oct.	14	4.8	23	0.16	23	-	4.3	-	56.6	39.1	23	-	17.4	21.7	17.4	4.3	39.2
Nov.	20	3.7	22	0.26	22	18.2	13.6	-	59.1	9.1	22	-	27.3	31.8	31.8	-	9.1
Dec.	17	4.1	17	0.28	17	-	-	-	100.0	-	17	-	5.9	52.9	29.4	11.8	-
Whole year	181	5.5	321	0.15	285	6.0	1.8	0.0	43.2	49.0	321	0.0	4.4	43.3	7.8	0.9	43.6

SP - Spilling
 PL - Plunging
 SP/PL - Combined spilling and plunging

Table 2.

Monthly and annual — Mean wave height/mean wave period and wave type/wave direction occurrences. Point Vernon • No. of Observations: 178 • Year 1978

Month	Non-CALM obs.	Mean wave period (secs)	No. obs.	Mean wave height (metres)	Percentage occurrence — wave type/wave direction												
					Wave type						Wave direction						
					No. obs.	SP	PL	Surge	SP/PL	CALM	No. obs.	1	2	3	4	5	CALM
Jan.	21	4.7	21	0.29	21	9.5	4.8	-	85.7	-	21	-	-	90.5	9.5	-	-
Feb.	18	5.2	18	0.31	18	-	55.6	-	44.4	-	18	-	5.6	66.7	22.2	5.5	-
March	10	4.3	11	0.28	10	-	10.0	-	80.0	10.0	11	-	36.4	45.5	9.1	-	9.0
April	13	5.8	13	0.27	13	-	15.4	-	84.6	-	13	-	23.1	69.2	7.7	-	-
May	17	5.5	19	0.24	19	-	10.6	-	78.9	10.5	19	-	10.5	68.5	10.5	-	10.5
June	10	6.4	12	0.17	11	27.3	-	-	54.5	18.2	12	-	8.3	66.7	8.3	-	16.7
July	10	5.3	10	0.31	10	-	40.0	-	60.0	-	10	-	60.0	30.0	10.0	-	-
August	16	5.9	17	0.22	17	-	11.8	-	82.4	5.8	17	-	23.5	58.8	11.8	-	5.9
Sept.	13	5.4	14	0.26	13	-	-	-	92.3	7.7	14	-	28.7	57.1	7.1	-	7.1
Oct.	16	4.8	16	0.31	16	-	18.8	-	81.2	-	16	-	12.5	31.3	56.2	-	-
Nov.	13	4.7	13	0.36	13	-	15.4	-	84.6	-	13	-	15.4	23.1	61.5	-	-
Dec.	14	4.8	14	0.54	14	-	14.3	-	85.7	-	14	-	50.0	42.9	7.1	-	-
Whole year	171	5.2	178	0.30	175	2.9	18.6	0.0	78.5	4.0	178	0.0	20.2	56.8	18.5	0.6	3.9

SP - Spilling
 PL - Plunging
 SP/PL - Combined spilling and plunging

Table 3.

Monthly and annual — Mean wave height/mean wave period and wave type/wave direction occurrences.
Point Vernon • No. of Observations: 141 • Year 1979

Month	Non-CALM obs.	Mean wave period (secs)	No. obs.	Mean wave height (metres)	Percentage occurrence — wave type/wave direction												
					Wave type						Wave direction						
					No. obs.	SP	PL	Surge	SP/PL	CALM	No. obs.	1	2	3	4	5	CALM
Jan.	21	4.3	21	0.36	21	-	4.8	-	95.2	-	21	-	4.8	52.3	42.9	-	-
Feb.	9	5.1	9	0.48	9	-	33.3	-	66.7	-	9	-	11.1	33.3	55.6	-	-
March	11	5.5	11	0.30	11	-	9.1	-	90.9	-	11	-	9.1	72.7	9.1	9.1	-
April	7	6.8	8	0.27	8	-	12.5	-	75.0	12.5	8	-	25.0	25.0	37.5	-	12.5
May	5	8.0	9	0.14	9	-	-	-	55.6	44.4	9	-	33.3	22.2	-	-	44.5
June	6	7.9	6	0.23	6	50.0	16.7	-	33.3	-	6	-	-	83.3	16.7	-	-
July	11	6.6	13	0.20	13	15.4	-	-	69.2	15.4	13	-	7.7	76.9	-	-	15.4
August	11	5.7	12	0.24	12	-	8.3	-	83.4	8.3	12	-	33.3	58.4	-	-	8.3
Sept.	11	4.3	13	0.24	13	-	-	-	84.6	15.4	13	-	30.8	38.5	15.4	-	15.3
Oct.	16	3.9	18	0.25	18	38.9	11.1	-	38.9	11.1	18	-	-	61.1	22.2	5.6	11.1
Nov.	10	4.5	10	0.44	10	-	20.0	-	80.0	-	9	-	22.2	55.6	22.2	-	-
Dec.	11	4.8	11	0.28	11	36.4	9.1	-	54.5	-	11	-	45.5	27.3	18.2	9.0	-
Whole year	129	5.2	141	0.29	141	11.3	9.3	0.0	70.9	8.5	140	0.0	17.1	51.5	20.7	2.1	-

SP - Spilling
 PL - Plunging
 SP/PL - Combined spilling and plunging

Table 4.

Monthly and annual — Mean wave height/mean wave period and wave type/wave direction occurrences.
Point Vernon • No. of Observations: 143 • Year 1980

Month	Non-CALM obs.	Mean wave period (secs)	No. obs.	Mean wave height (metres)	Percentage occurrence — wave type/wave direction												
					Wave type						Wave direction						
					No. obs.	SP	PL	Surge	SP/PL	CALM	No. obs.	1	2	3	4	5	CALM
Jan.	15	4.4	15	0.31	15	-	-	13.3	86.7	-	15	-	20.0	46.7	33.3	-	-
Feb.	15	5.9	15	0.34	15	20.0	-	-	80.0	-	15	-	26.7	26.7	46.6	-	-
March	12	5.7	13	0.25	13	7.7	7.7	-	78.9	7.7	13	-	23.0	30.8	38.5	-	7.7
April	8	5.6	10	0.19	10	10.0	-	-	70.0	20.0	10	-	-	40.0	40.0	-	20.0
May	6	7.1	11	0.12	11	-	-	-	54.5	45.5	11	-	-	54.5	-	-	45.5
June	4	6.0	12	0.08	12	-	8.3	8.3	16.7	66.7	12	-	-	25.0	8.3	-	66.7
July	6	5.3	11	0.12	11	18.1	-	-	36.4	45.5	11	-	18.2	18.2	18.2	-	45.4
August	5	5.6	10	0.16	10	-	-	-	60.0	40.0	10	-	20.0	10.0	30.0	-	40.0
Sept.	9	5.0	12	0.26	12	8.3	16.7	-	50.0	25.0	12	-	25.0	41.7	8.3	-	25.0
Oct.	11	4.0	12	0.27	11	-	-	-	90.9	9.1	12	-	41.7	41.7	8.3	-	8.3
Nov.	9	4.2	9	0.30	9	-	-	-	100.0	-	9	-	22.2	11.1	66.7	-	-
Dec.	8	4.8	13	0.22	13	30.8	7.7	-	23.0	38.5	13	-	30.8	15.4	15.4	-	38.4
Whole year	108	5.2	143	0.22	142	8.5	3.5	2.1	62.0	23.9	143	0.0	19.6	30.8	25.9	0.0	23.7

SP - Spilling
 PL - Plunging
 SP/PL - Combined spilling and plunging

Table 5.

Monthly and annual — Mean wave height/mean wave period and wave type/wave direction occurrences.
Point Vernon • No. of Observations: 157 • Year 1981

Month	Non-CALM obs.	Mean wave period (secs)	No. obs.	Mean wave height (metres)	Percentage occurrence — wave type/wave direction													
					Wave type						Wave direction							
					No. obs.	SP	PL	Surge	SP/PL	CALM	No. obs.	1	2	3	4	5	CALM	
Jan.	14	4.5	16	0.17	16	43.8	-	-	-	43.8	12.4	16	-	-	31.3	56.3	-	12.4
Feb.	15	4.9	19	0.22	19	-	5.3	-	-	73.7	21.0	17	-	-	29.4	47.1	-	23.5
March	9	6.1	14	0.16	14	-	-	7.1	57.1	35.6	14	-	-	42.9	21.4	-	35.7	
April	8	5.8	13	0.16	13	-	15.4	-	46.2	38.4	13	-	-	46.2	15.4	-	38.4	
May	7	7.1	11	0.24	10	-	10.0	-	50.0	40.0	11	-	-	45.5	18.1	-	36.4	
June	9	6.2	12	0.22	12	33.3	-	-	41.7	25.0	12	-	-	66.7	8.3	-	25.0	
July	10	5.7	15	0.18	15	26.7	6.7	6.7	26.7	33.2	15	-	-	46.7	20.0	-	33.3	
August	9	5.2	12	0.20	11	9.1	9.1	-	54.5	27.3	12	-	-	58.3	16.7	-	25.0	
Sept.	10	5.4	11	0.25	11	-	-	-	90.9	9.1	11	-	-	54.5	36.4	-	9.1	
Oct.	10	4.9	12	0.30	12	-	-	-	83.3	16.7	12	-	8.3	33.3	41.7	-	16.7	
Nov.	11	4.5	13	0.25	13	-	-	-	84.6	15.4	12	-	-	75.0	8.3	-	16.7	
Dec.	9	5.0	11	0.25	11	-	9.1	-	72.7	18.2	11	-	-	54.5	27.3	-	18.2	
Whole year	121	5.3	159	0.21	157	10.2	4.5	1.3	59.9	24.1	156	0.0	0.6	47.4	27.6	0.0	24.4	

SP - Spilling
PL - Plunging
SP/PL - Combined spilling and plunging

Table 6.

Monthly and annual — Mean wave height/mean wave period and wave type/wave direction occurrences.
Point Vernon • No. of Observations: 115 • Year 1982

Month	Non-CALM obs.	Mean wave period (secs)	No. obs.	Mean wave height (metres)	Percentage occurrence — wave type/wave direction													
					Wave type						Wave direction							
					No. obs.	SP	PL	Surge	SP/PL	CALM	No. obs.	1	2	3	4	5	CALM	
Jan.	7	5.3	7	0.21	7	28.6	-	-	-	71.4	-	7	-	14.3	28.6	42.9	14.2	-
Feb.	12	4.7	13	0.25	13	7.7	-	7.7	76.9	7.7	13	-	-	53.8	30.8	7.7	7.7	
March	8	5.0	9	0.22	9	11.1	-	-	77.8	11.1	9	-	-	33.3	44.5	11.1	11.1	
April	8	7.7	12	0.23	12	-	8.3	8.3	50.0	33.2	12	-	-	50.0	16.7	-	33.3	
May	6	6.3	9	0.13	9	-	-	-	66.7	33.3	9	-	-	33.3	33.4	-	33.3	
June	2	7.5	7	0.06	7	-	-	-	28.6	71.4	7	-	-	28.6	-	-	71.4	
July	0	0.0	1	0.00	1	-	-	-	-	100.0	1	-	-	-	-	-	100.0	
August	5	5.3	8	0.12	7	14.2	-	-	42.9	42.9	8	-	-	25.0	37.5	-	37.5	
Sept.	6	5.5	13	0.10	11	18.2	-	-	18.2	63.6	13	-	-	38.5	7.7	-	53.8	
Oct.	4	4.3	11	0.10	11	-	-	-	36.4	63.6	11	-	-	27.3	9.1	-	63.6	
Nov.	5	5.0	8	0.11	8	12.5	-	-	50.0	37.5	8	-	-	12.5	25.0	25.0	37.5	
Dec.	9	5.4	17	0.16	17	11.8	11.7	-	29.4	47.1	17	-	5.9	17.8	29.4	-	47.1	
Whole year	72	5.5	115	0.16	112	8.9	2.7	1.8	48.2	38.4	115	0.0	1.7	32.3	24.3	4.3	37.4	

SP - Spilling
PL - Plunging
SP/PL - Combined spilling and plunging

Table 7.

Monthly and annual — Mean wave height/mean wave period and wave type/wave direction occurrences.
Point Vernon • No. of Observations: 69 • Year 1983

Month	Non-CALM obs.	Mean wave period (secs)	No. obs.	Mean wave height (metres)	Percentage occurrence — wave type/wave direction														
					Wave type						Wave direction								
					No. obs.	SP	PL	Surge	SP/PL	CALM	No. obs.	1	2	3	4	5	CALM		
Jan.	10	4.2	18	0.12	18	5.6	-	-	-	50.0	44.4	18	-	11.1	16.7	27.8	-	-	44.4
Feb.	3	3.6	3	0.17	3	-	-	-	100.0	-	-	3	-	-	33.3	66.7	-	-	-
March	3	5.5	10	0.06	10	-	-	-	30.0	70.0	10	-	-	10.0	20.0	-	-	-	70.0
April	5	6.7	7	0.13	7	14.3	-	-	57.1	28.6	7	-	-	71.4	-	-	-	-	28.6
May	3	4.6	5	0.14	5	20.0	-	-	40.0	40.0	5	-	-	20.0	40.0	-	-	-	40.0
June	4	6.0	7	0.10	7	-	-	-	57.1	42.9	7	-	-	42.9	14.3	-	-	-	42.8
July	2	6.9	6	0.07	6	-	-	-	33.3	66.7	6	-	-	33.3	-	-	-	-	66.7
Sept.	2	4.0	3	0.13	3	-	-	-	66.7	33.3	3	-	-	33.3	33.3	-	-	-	33.4
Oct.	1	4.5	1	0.31	1	-	-	-	100.0	-	1	-	-	100.0	-	-	-	-	-
Dec.	7	5.8	9	0.12	9	11.1	-	66.7	-	22.2	9	-	-	44.4	-	44.5	-	-	11.1
Whole year	40	5.2	69	0.11	69	5.8	0.0	8.7	43.5	42.0	69	0.0	2.9	31.9	18.8	5.8	-	-	40.6

SP - Spilling SP/PL - Combined spilling and plunging
PL - Plunging

Table 8.

Monthly and annual — Mean wave height/mean wave period and wave type/wave direction occurrences.
Point Vernon • No. of Observations: 232 • Year 1984

Month	Non-CALM obs.	Mean wave period (secs)	No. obs.	Mean wave height (metres)	Percentage occurrence — wave type/wave direction														
					Wave type						Wave direction								
					No. obs.	SP	PL	Surge	SP/PL	CALM	No. obs.	1	2	3	4	5	CALM		
Jan.	27	4.1	31	0.21	31	-	-	74.2	12.9	12.9	31	-	3.2	19.4	25.8	38.7	12.9	-	-
Feb.	19	3.9	20	0.14	20	-	-	100.0	-	-	20	-	25.0	-	20.0	55.0	-	-	-
March	17	3.1	29	0.07	29	-	-	58.6	-	41.4	29	-	31.0	3.4	-	24.2	41.4	-	-
April	9	3.3	30	0.06	30	-	-	33.3	-	66.7	30	-	-	10.0	-	23.3	66.7	-	-
June	7	3.4	24	0.03	24	-	-	29.2	-	70.8	24	-	4.2	-	4.2	20.8	70.8	-	-
July	6	4.0	31	0.02	31	-	-	6.5	12.9	80.8	31	3.2	-	6.5	-	9.7	80.6	-	-
August	12	3.8	21	0.14	21	-	4.7	-	52.4	42.9	21	-	23.8	4.8	9.5	19.0	42.9	-	-
Nov.	13	3.7	15	0.14	15	-	13.4	-	73.3	13.3	15	-	33.3	-	6.7	46.7	13.3	-	-
Dec.	24	3.3	31	0.24	31	-	6.5	-	74.2	19.3	31	12.9	22.6	9.7	9.7	25.8	19.3	-	-
Whole year	134	3.6	232	0.12	232	0.0	2.2	34.1	22.8	40.9	232	2.2	14.2	6.9	8.2	27.6	40.9	-	-

SP - Spilling SP/PL - Combined spilling and plunging
PL - Plunging

Table 9.

Monthly and annual — Mean wave height/mean wave period and wave type/wave direction occurrences.
Point Vernon • No. of Observations: 203 • Year 1985

Month	Non-CALM obs.	Mean wave period (secs)	No. obs.	Mean wave height (metres)	Percentage occurrence — wave type/wave direction														
					Wave type						Wave direction								
					No. obs.	SP	PL	Surge	SP/PL	CALM	No. obs.	1	2	3	4	5	CALM		
Jan.	26	3.3	30	0.20	30	-	3.3	-	83.4	13.3	30	-	40.0	10.0	3.4	33.3	13.3	-	-
Feb.	21	3.2	27	0.14	27	-	11.1	-	66.7	22.2	27	-	11.1	-	7.4	59.3	22.2	-	-
March	23	3.6	30	0.12	30	-	-	-	78.7	23.3	30	-	3.3	6.7	6.7	60.0	23.3	-	-
April	13	3.3	20	0.12	20	-	-	-	65.0	35.0	19	-	10.5	10.5	31.7	36.8	-	-	
May	14	3.6	30	0.08	30	-	-	-	48.7	53.3	30	-	3.3	-	3.3	40.0	53.4	-	-
June	5	3.1	25	0.03	25	-	-	-	24.0	76.0	25	-	8.0	-	4.0	12.0	76.0	-	-
Sept.	18	3.3	24	0.20	24	-	-	-	75.0	25.0	24	4.2	41.7	-	12.5	16.8	25.0	-	-
Dec.	15	3.4	17	0.26	17	-	-	-	88.2	11.8	17	5.9	41.2	-	29.4	11.8	11.7	-	-
Whole year	135	3.4	203	0.14	203	0.0	2.0	0.0	66.0	33.0	232	1.0	18.8	3.5	8.4	35.1	33.2	-	-

SP - Spilling SP/PL - Combined spilling and plunging
PL - Plunging

Table 10.

Monthly and annual — Mean wave height/mean wave period and wave type/wave direction occurrences.
Point Vernon • No. of Observations: 209 • Year 1986

Month	Non-CALM obs.	Mean wave period (secs)	No. obs.	Mean wave height (metres)	Percentage occurrence — wave type/wave direction												
					Wave type						Wave direction						
					No. obs.	SP	PL	Surge	SP/PL	CALM	No. obs.	1	2	3	4	5	CALM
Jan.	16	3.1	21	0.15	15	-	-	-	66.7	33.3	21	-	4.8	-	4.8	66.6	23.8
Feb.	21	3.0	27	0.21	-	CR	CR	CR	CR	CR	27	3.7	14.8	-	22.2	37.0	22.3
March	27	3.2	30	0.18	-	-	-	-	-	-	30	6.7	3.3	-	13.3	66.7	10.0
April	14	3.1	19	0.17	-	-	-	-	-	-	17	-	-	11.8	17.6	41.2	29.4
June	9	3.1	30	0.03	-	-	-	-	-	-	30	3.3	-	-	3.3	23.3	70.1
July	11	3.1	29	0.07	-	-	-	-	-	-	29	3.4	10.3	-	3.4	17.3	65.6
August	18	3.4	31	0.09	-	-	-	-	-	-	31	6.5	3.2	9.7	3.2	32.3	45.1
Nov.	17	3.2	22	0.10	-	-	-	-	-	-	22	27.3	9.1	4.5	-	36.4	22.7
Whole year	133	3.1	209	0.12	15	0.0	0.0	0.0	66.7	33.3	207	6.3	5.8	2.9	8.2	39.1	37.7

SP - Spilling
 PL - Plunging
 SP/PL - Combined spilling and plunging
 CR - Ceased Recording

Table 11.

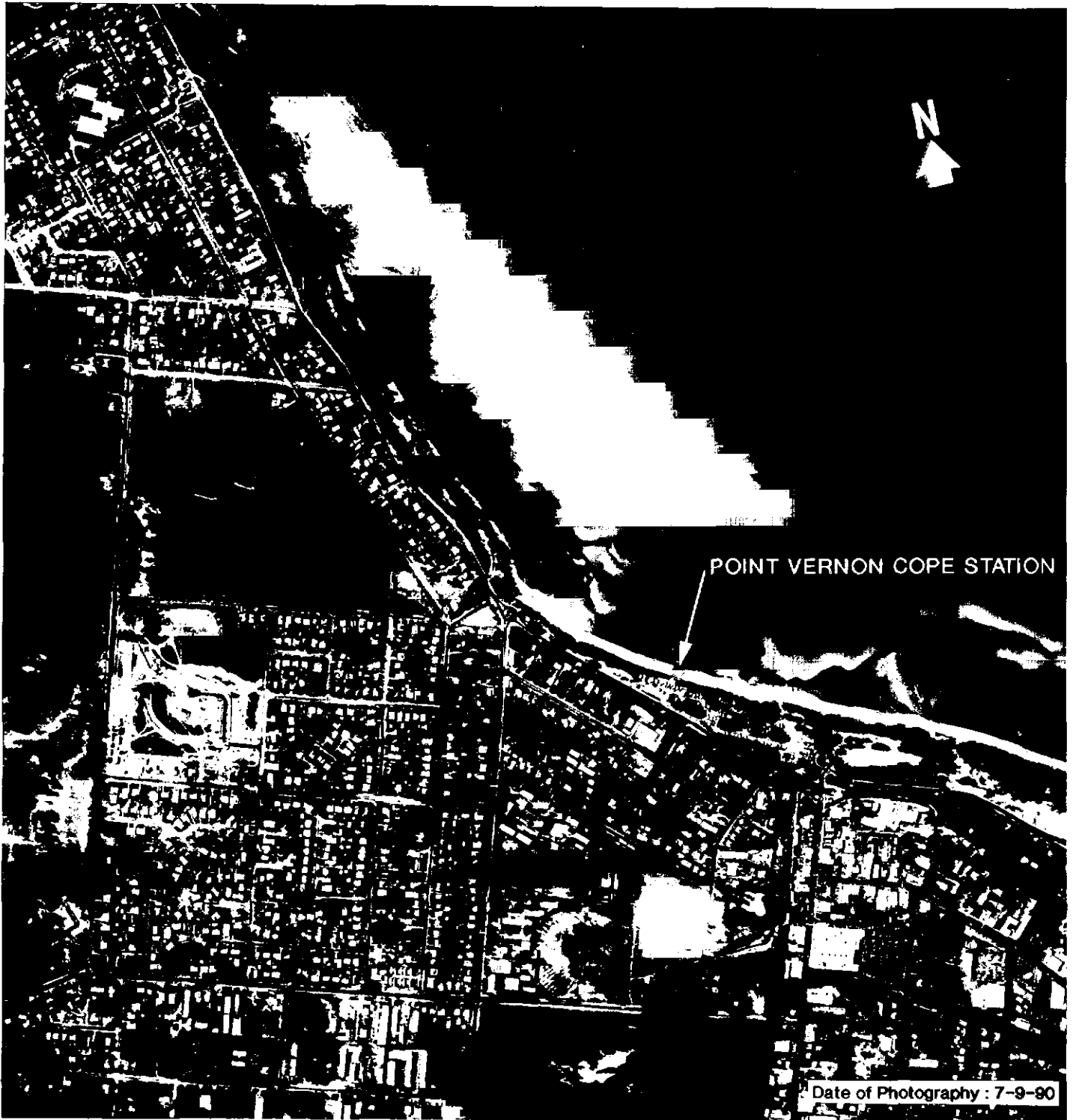
Monthly and annual — Mean wave height/mean wave period and wave type/wave direction occurrences.
Point Vernon • No. of Observations: 252 • Year 1987

Month	Non-CALM obs.	Mean wave period (secs)	No. obs.	Mean wave height (metres)	Percentage occurrence — wave direction						
					No. obs.	1	2	3	4	5	CALM
Jan.	29	3.2	31	0.21	31	38.7	12.9	9.7	9.7	22.6	6.4
Feb.	23	3.3	27	0.10	27	14.8	7.4	-	3.7	59.3	14.8
March	17	2.9	30	0.07	30	20.0	3.3	-	10.0	23.4	43.3
April	16	3.1	30	0.06	30	-	6.7	-	6.7	40.0	46.6
May	4	2.4	23	0.02	23	-	-	-	4.3	17.4	78.3
June	9	3.0	24	0.06	24	-	4.2	-	-	33.3	62.5
July	8	2.9	19	0.06	19	-	26.3	10.5	5.3	-	57.9
August	13	2.6	30	0.06	30	3.3	13.3	3.4	-	23.3	56.7
Sept.	15	2.6	18	0.14	18	6.3	25.0	6.3	-	56.2	6.2
Oct.	18	2.6	20	0.12	20	20.0	10.0	5.0	5.0	25.0	35.0
Whole year	147	3.0	252	0.09	250	11.2	10.0	3.2	4.8	30.0	40.8

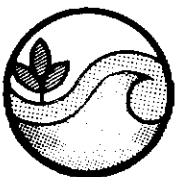
Table 12.

Monthly and annual — Mean wave height/mean wave period and wave type/wave direction occurrences.
Point Vernon • No. of Observations: 175 • Year 1988

Month	Non-CALM obs.	Mean wave period (secs)	No. obs.	Mean wave height (metres)	Percentage occurrence — wave direction						
					No. obs.	1	2	3	4	5	CALM
Jan.	17	2.9	20	0.12	20	5.0	20.0	10.0	10.0	40.0	15.0
Feb.	22	2.9	26	0.14	26	-	15.4	3.8	7.7	57.7	15.4
March	25	2.9	27	0.14	27	7.4	7.4	3.7	7.4	66.7	7.4
April	9	2.6	18	0.05	18	-	-	5.8	-	44.4	50.0
May	11	2.5	28	0.04	28	7.1	10.7	7.2	3.6	10.7	60.7
July	5	2.8	9	0.10	9	11.1	44.4	-	-	-	44.5
August	13	2.8	21	0.10	20	20.0	10.0	-	5.0	30.0	35.0
Nov.	24	2.3	26	0.22	26	15.4	26.9	11.5	7.7	30.8	7.7
Whole year	126	2.7	175	0.12	174	8.0	14.9	5.7	5.8	37.9	27.7



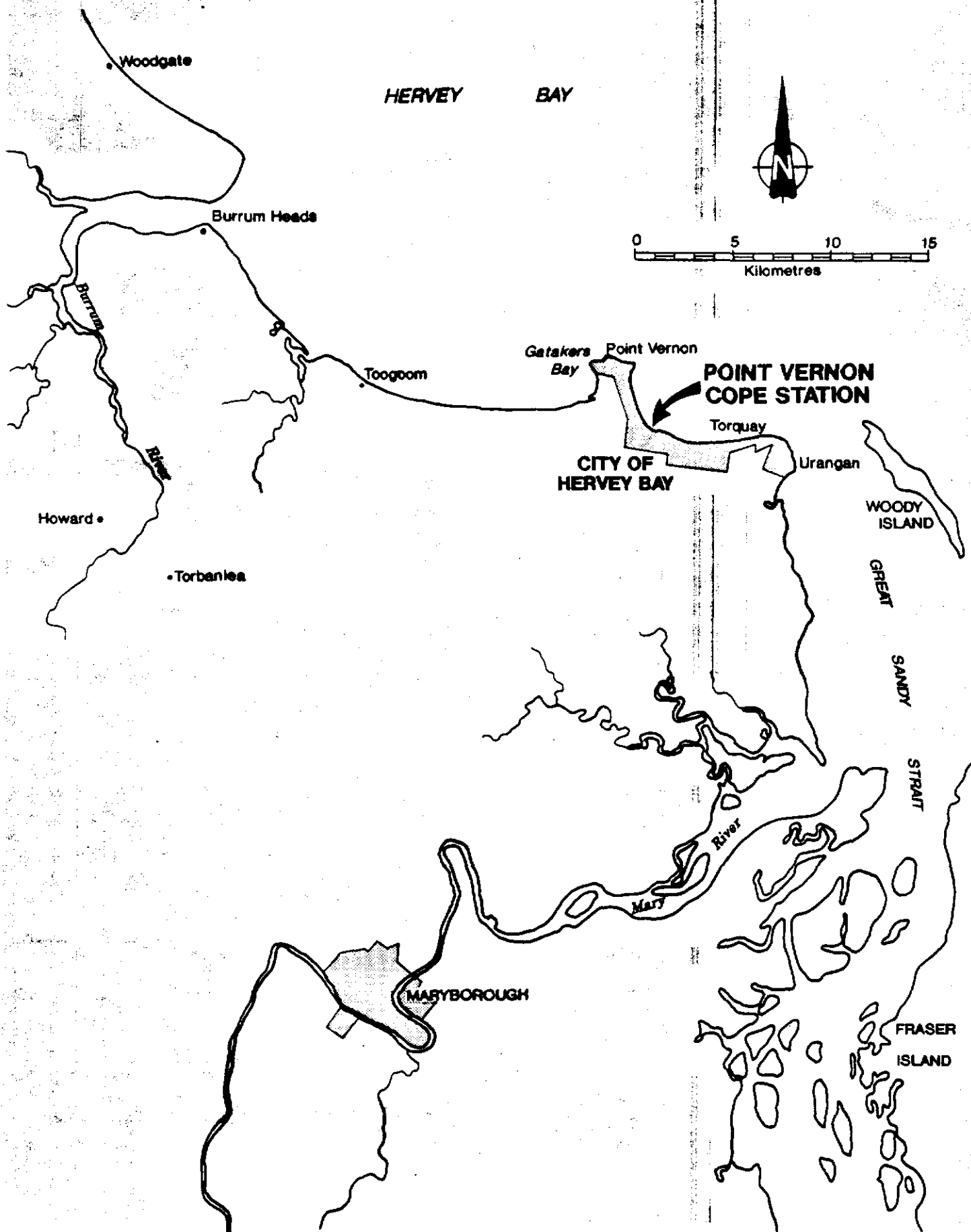
100 0 100 200 300 400 500 metres
Scale 1:12 000 approx.



Beach Protection Authority
Queensland

SITE PLAN

COPE
Point Vernon
Figure
1.1
C 29.1



Beach Protection Authority
Queensland

LOCALITY PLAN

COPE

Point Vernon

Figure

1.2

C 29.1



BEACH PROTECTION AUTHORITY OF QUEENSLAND

Form No. BE 14F

COASTAL OBSERVATION PROGRAMME - ENGINEERING

COPE

RECORD ALL DATA CAREFULLY AND LEGIBLY

<u>SITE NUMBER</u> 1 2 3 4 5 <input type="text"/>	<u>DAY</u> 6 7 <input type="text"/>	<u>MONTH</u> 8 9 <input type="text"/>	<u>YEAR</u> 10 11 <input type="text"/>	<u>TIME</u> <input type="checkbox"/> Record 1 if Summer Time or <input type="checkbox"/> Standard Time	Record time using 24 hour system 12 13 14 15 <input type="text"/>	
(i) <u>WAVE HEIGHT (AVERAGE)</u> Record the best estimate of the average breaking wave height to the nearest tenth of a metre. If less than 0.1 record as 0.0 and go directly to Section (ii).			16 <input type="text"/> 17 <input type="text"/>	<u>WAVE HEIGHT (MAXIMUM)</u> Record the best estimate of the maximum breaking wave height during the entire observation period to the nearest tenth of a metre.		
<u>WAVE HEIGHT METHOD</u> Record the method that you used to obtain wave height. Record 1 if visual estimate Record 2 if measured with COPE sticks Record 3 if measured by COPE pole			20 <input type="text"/>	<u>WAVE PERIOD</u> Record the time in seconds for eleven (11) wave crests to pass a stationary point just seaward of the surf zone.		
<u>WAVE DIRECTION</u> Determine the direction that the waves are entering the surf zone using the compass provided and record the direction in degrees.			24 <input type="text"/> 25 <input type="text"/> 26 <input type="text"/>	<u>SURF ZONE WIDTH</u> Record the time in seconds for a wave of average height to traverse the surf zone from break point to final run-up on the beach.		
(ii) <u>CURRENT SPEED</u> Measure in metres the distance that the centre of the dye patch is observed to move during a one (1) minute period; if no long shore movement record 000.			30 <input type="text"/> 31 <input type="text"/> 32 <input type="text"/>	<u>CURRENT DIRECTION</u> When the observer faces the sea O — no long shore movement L — dye moves to the left R — dye moves to the right		
<u>DISTANCE FROM SHORE</u> Record the distance in metres from the shore to where the current measurements were commenced.			34 <input type="text"/> 35 <input type="text"/>	<u>OFFSHORE BAR</u> Is an off-shore bar causing the waves to break? 1—yes 0—no		
(iii) <u>WIND SPEED</u> Record wind speed to the nearest m.p.h. If calm record 00 and go directly to Section (iv).			37 <input type="text"/> 38 <input type="text"/>	<u>WIND DIRECTION</u> Determine the direction that the wind is coming from using the compass provided and record the direction in degrees.		
(iv) <u>FIXED CONTOUR ELEVATION</u> Record the elevation of the fixed contour.			42 <input type="text"/> 43 <input type="text"/>	<u>DISTANCE TO FIXED CONTOUR</u> Record the distance, to the nearest metre, from the reference post to the fixed contour. Distances landward of the reference post are negative. e.g. 009 measures 9 metres seaward (No sign); —07 measures 7 metres landward. (Minus sign)		
(v) <u>DISTANCE TO THE VEGETATION</u> Record the distance from the reference post to the average vegetation line. Distances landward of the reference post are negative.			47 <input type="text"/> 48 <input type="text"/> 49 <input type="text"/>	<u>SAND LEVEL AT POLE</u> Record to nearest tenth of a metre.		
(vi) <u>SAND SAMPLE</u> If sample taken then record 1. Otherwise leave blank. <input type="checkbox"/> 52	<u>PLEASE PRINT</u> Please check the form for completeness					
	<u>SITE NAME</u>		<u>OBSERVER</u>			
	<u>REMARKS:</u> _____ _____					
	Make any additional remarks, computations or sketches on the reverse side of this form.					
	(for office use only)					
	53 54 55 56 57 58 59 60 61 62 63 64 65 66 67 68 69 70 71 72 73 74 75 76 77 78 79 80					
	<input type="text"/>					

119057-F 402-GCPRINT



Beach Protection Authority
Queensland

OBSERVATION FORM

COPE
Point Vernon
Figure
2.1
C 29.1

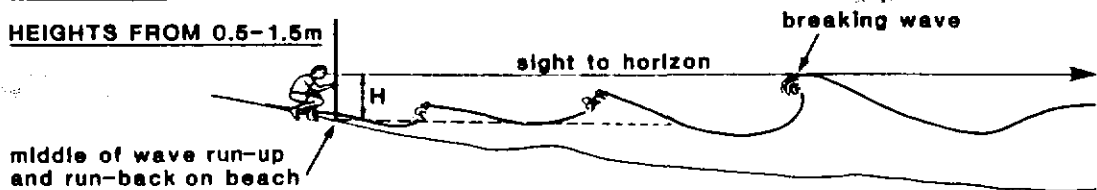
WAVE HEIGHT AND DIRECTION INSTRUCTIONS

METHOD 1 VISUAL ESTIMATION

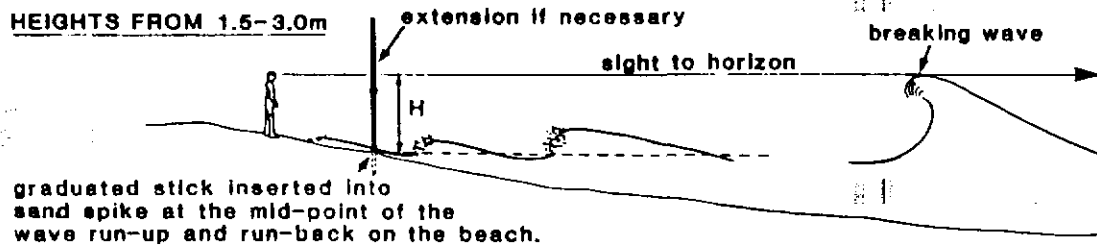
This method should only be used where the waveheights are below 0.5 and it is not practicable to use the preferred Method 2.

METHOD 2

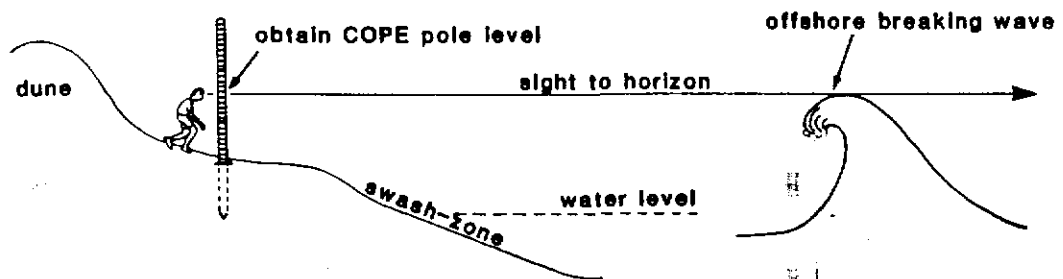
HEIGHTS FROM 0.5-1.5m



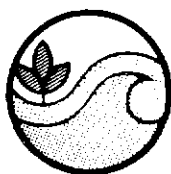
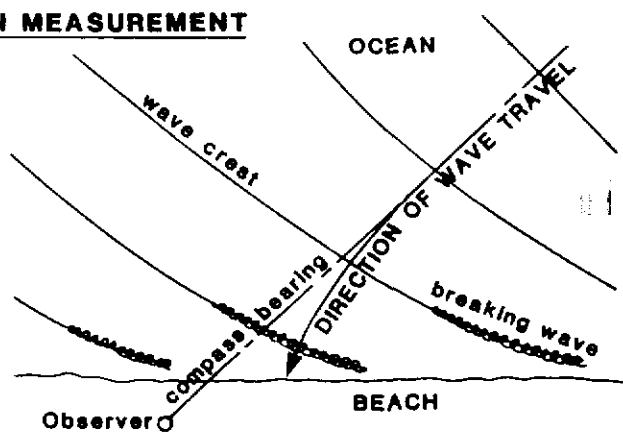
HEIGHTS FROM 1.5-3.0m



METHOD 3 FOR WAVES OVER 3m



WAVE DIRECTION MEASUREMENT



Beach Protection Authority
Queensland

METHODS FOR RECORDING WAVE PARAMETERS

COPE
Point Vernon

Figure
2.2

C 29.1

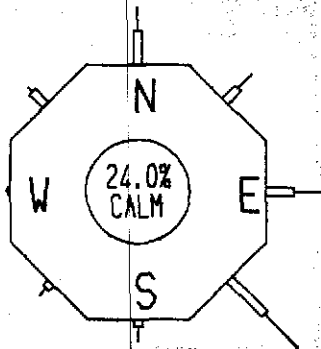
COPE - Coastal Observation Programme Engineering

HERVEY BAY CITY

POINT VERNON

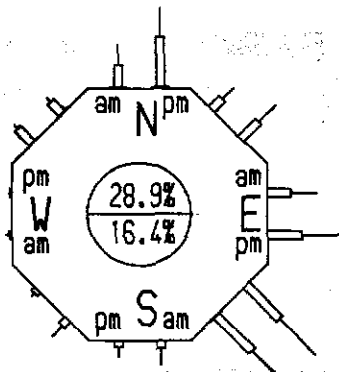
4203

ALL OBSERVATIONS



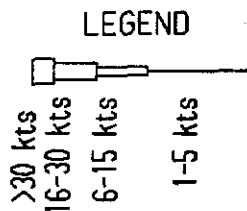
Total No. of Observations : 2366

MORNING - AFTERNOON OBSERVATIONS

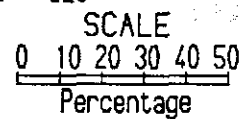


NOTES :
 Figures in Central Circle
 Represent Percentage
 of CALM Observations.
 Upper Figure for AM
 Lower Figure for PM

No. of Morning Observations : 1441
 No. of Afternoon Observations : 925



Mean Time :- Morning Obs : 0927 hrs
 Mean Time :- Afternoon Obs : 1523 hrs



WIND DATA - MAR 1977 to NOV 1988

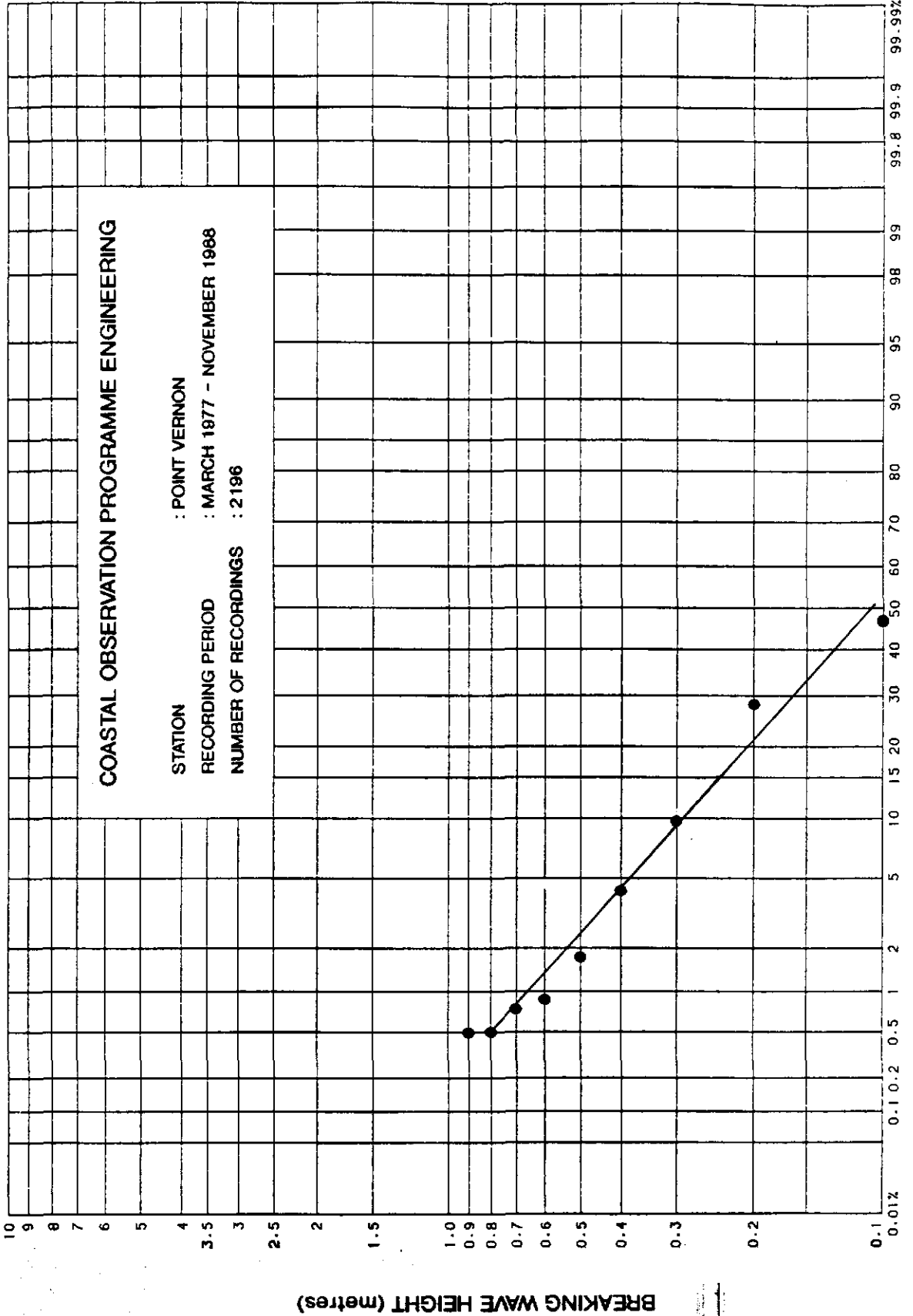


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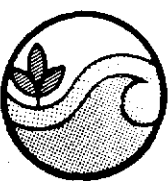
WIND DATA

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Figure
3
 C 29.1



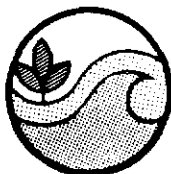
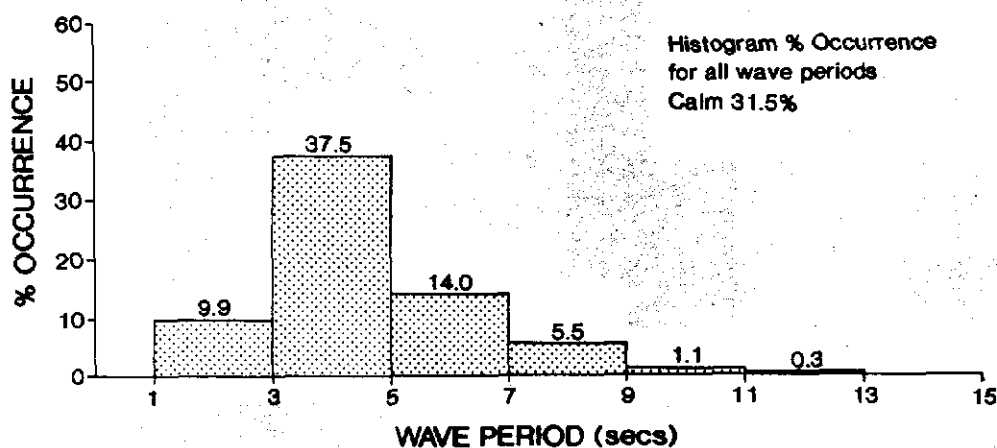
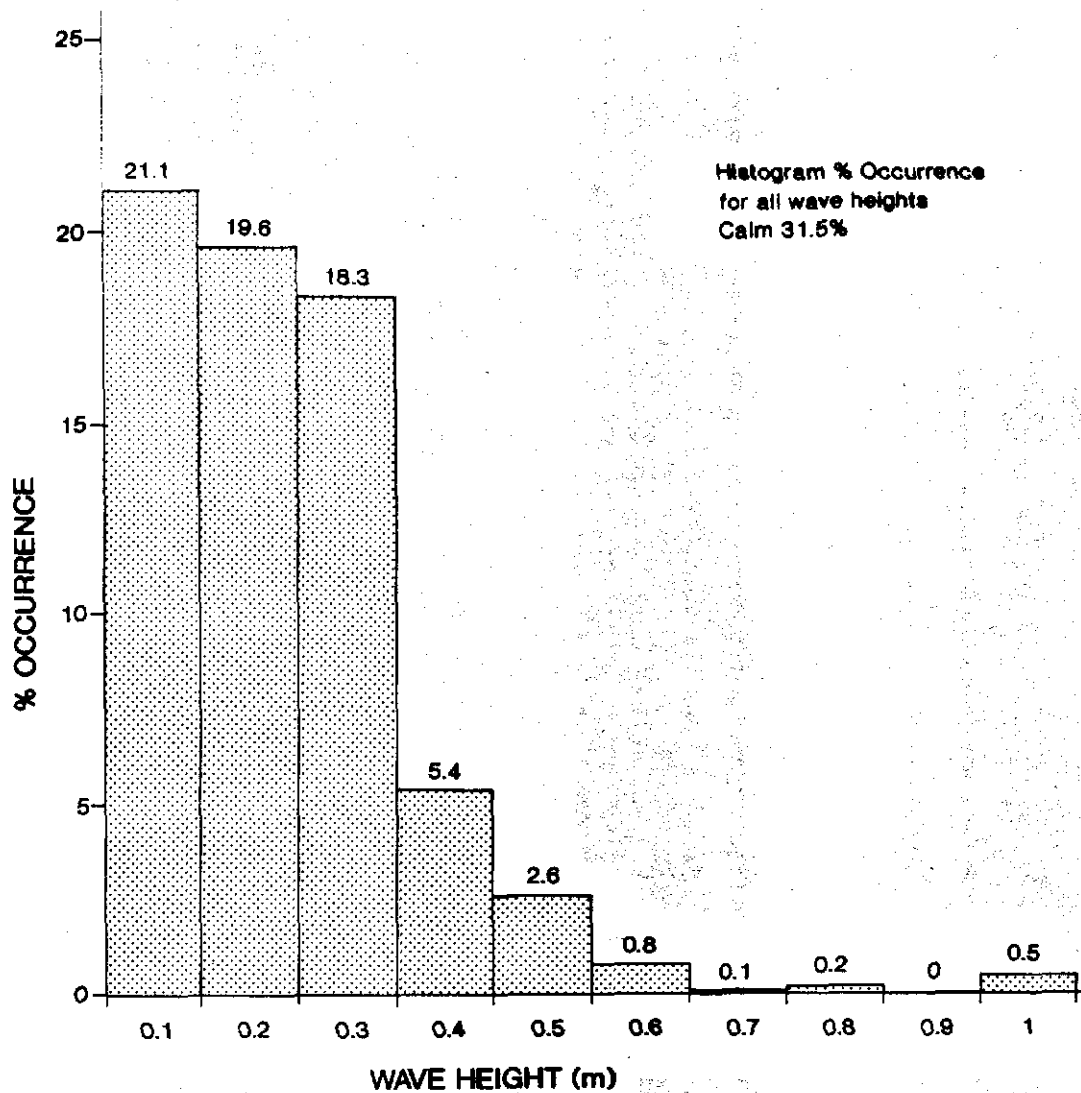
PERCENTAGE OF RECORDINGS WHERE A GIVEN BREAKER HEIGHT IS EXCEEDED



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WAVE HEIGHT PERCENTAGE EXCEEDANCE

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4
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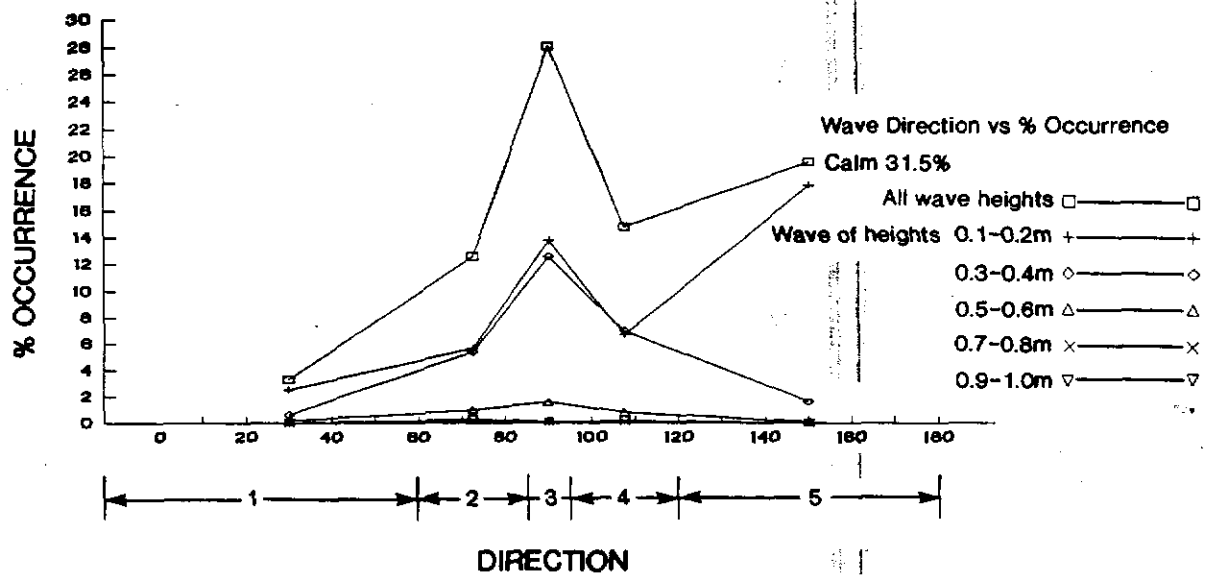
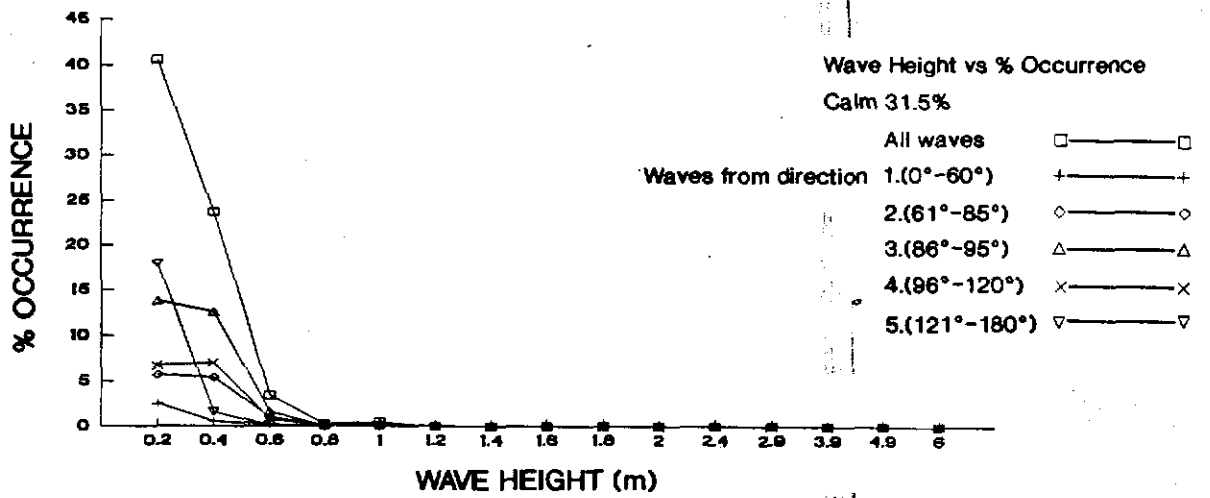
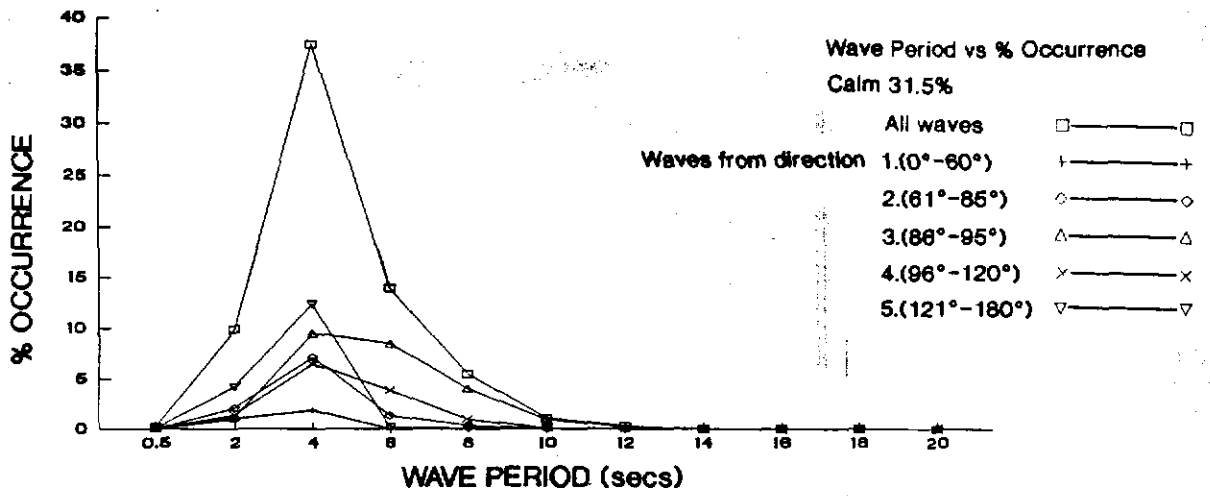
PERCENTAGE OCCURRENCE OF WAVE HEIGHT AND WAVE PERIOD

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Figure

5

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WAVE DIRECTION ANALYSIS

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Figure

6

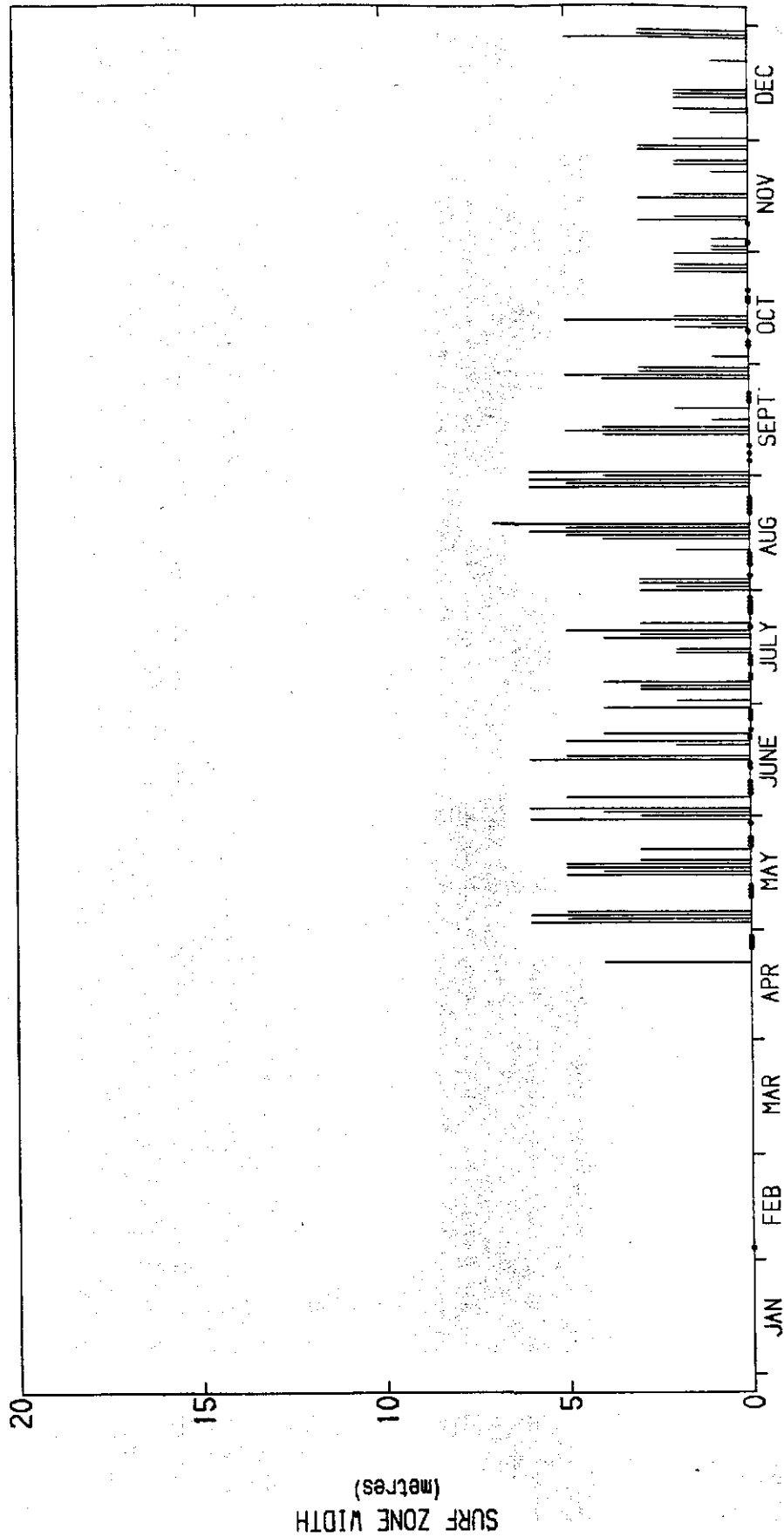
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SURF ZONE WIDTH SUMMARY - 1977

No. of Observations : 145

MORNING OBSERVATIONS

Mean Surf Zone Width = 2.0 m



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SURF ZONE WIDTH - MORNING 1977

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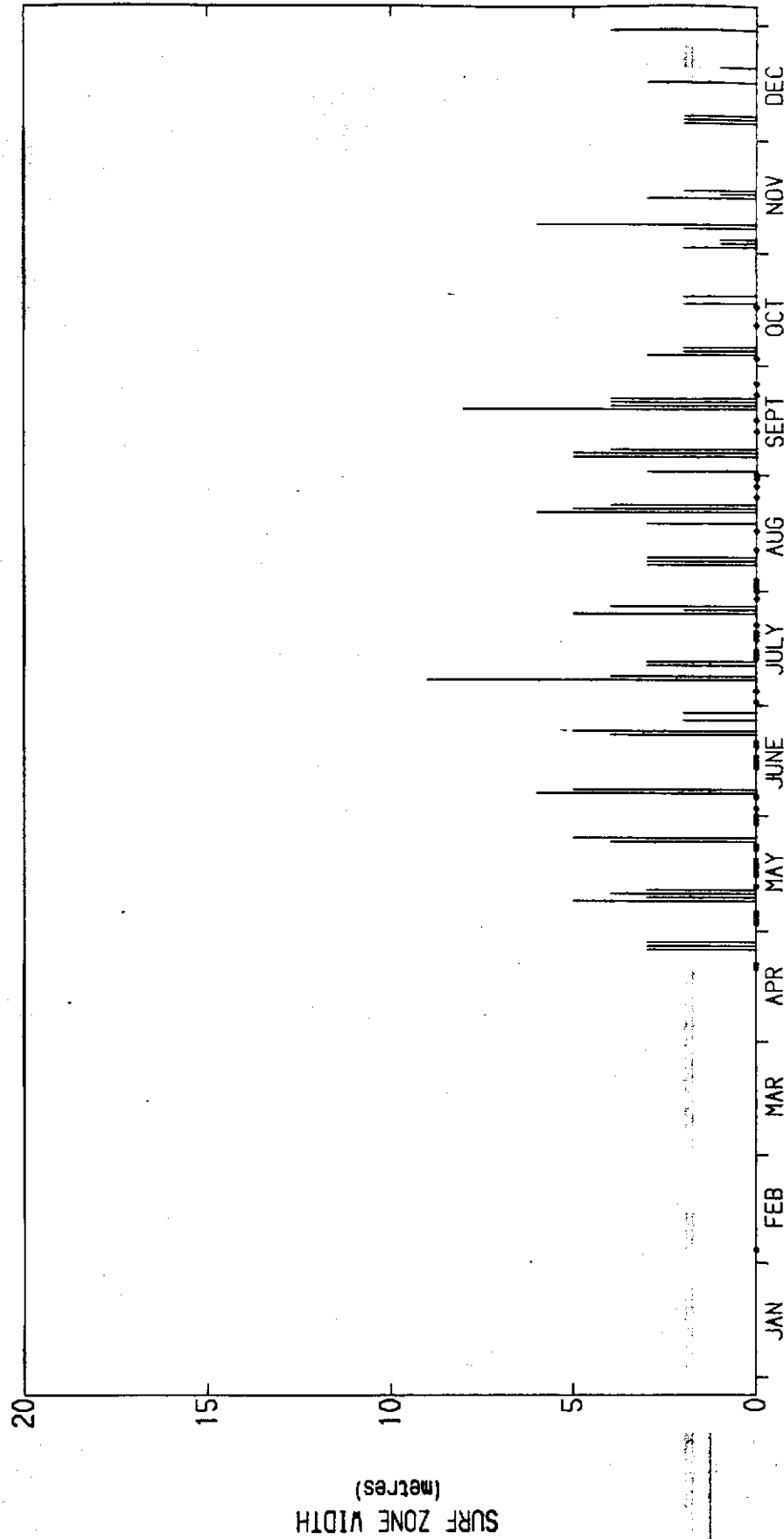
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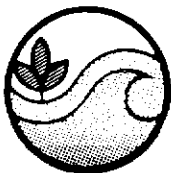


SURF ZONE WIDTH SUMMARY - 1977

No. of Observations : 108

AFTERNOON OBSERVATIONS

Mean Surf Zone Width = 1.8 m



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SURF ZONE WIDTH - AFTERNOON 1977

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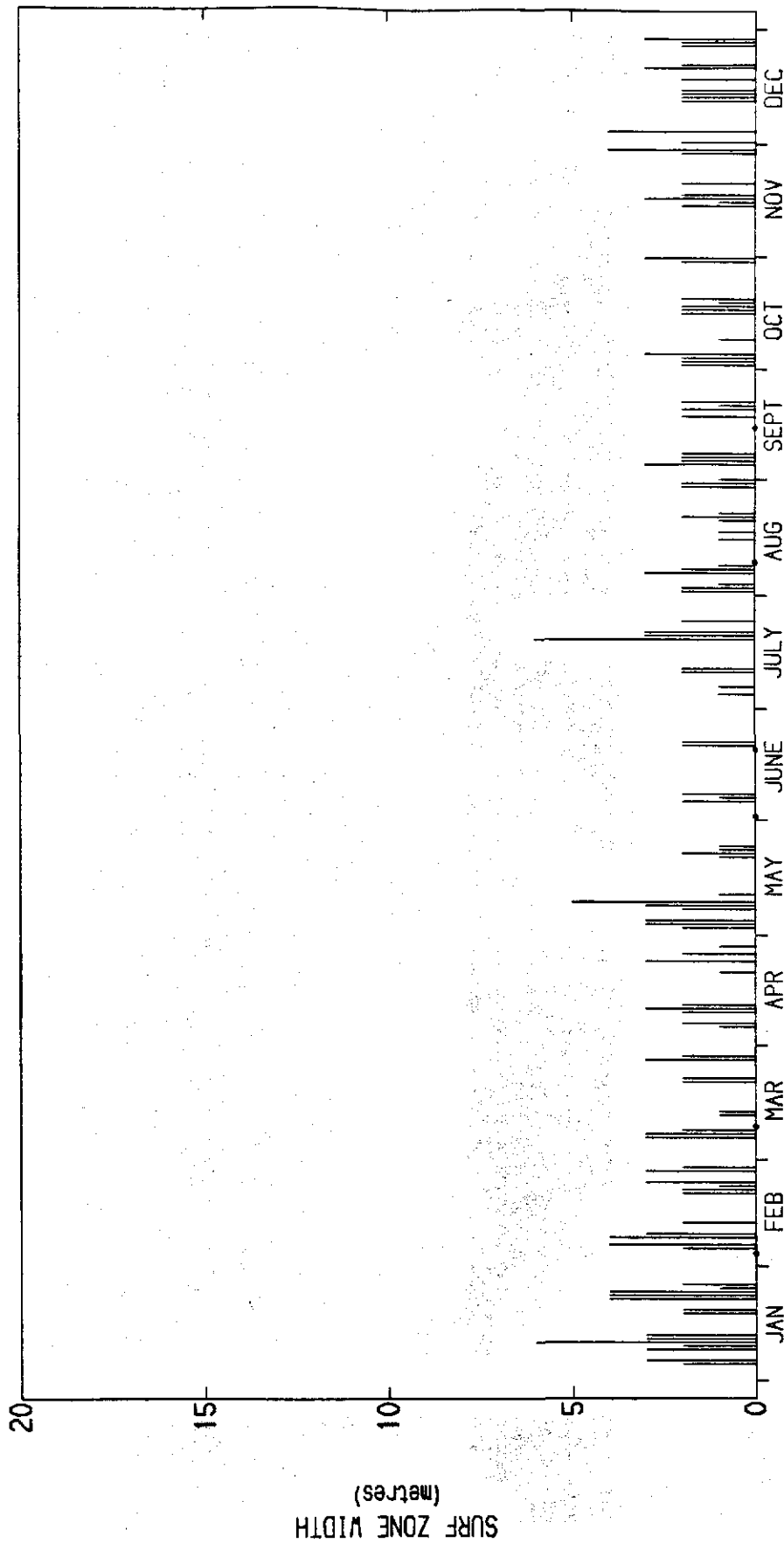
SURF ZONE WIDTH - MORNING 1978

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SURF ZONE WIDTH SUMMARY - 1978

No. of Observations : 125

MORNING OBSERVATIONS

Mean Surf Zone Width = 2.1 m

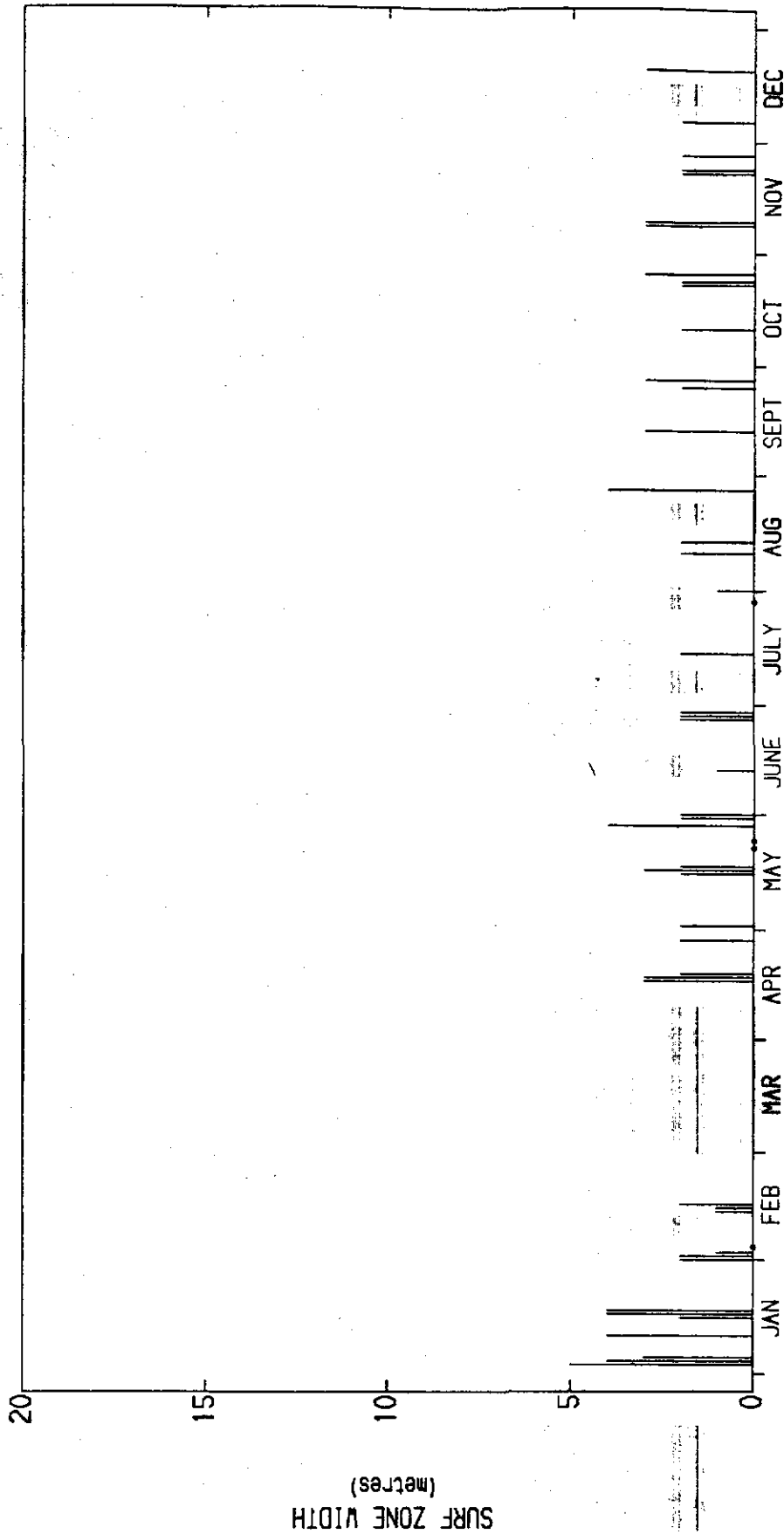
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9
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SURF ZONE WIDTH SUMMARY - 1978

No. of Observations : 50

AFTERNOON OBSERVATIONS

Mean Surf Zone Width = 2.3 m



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SURF ZONE WIDTH - AFTERNOON 1978

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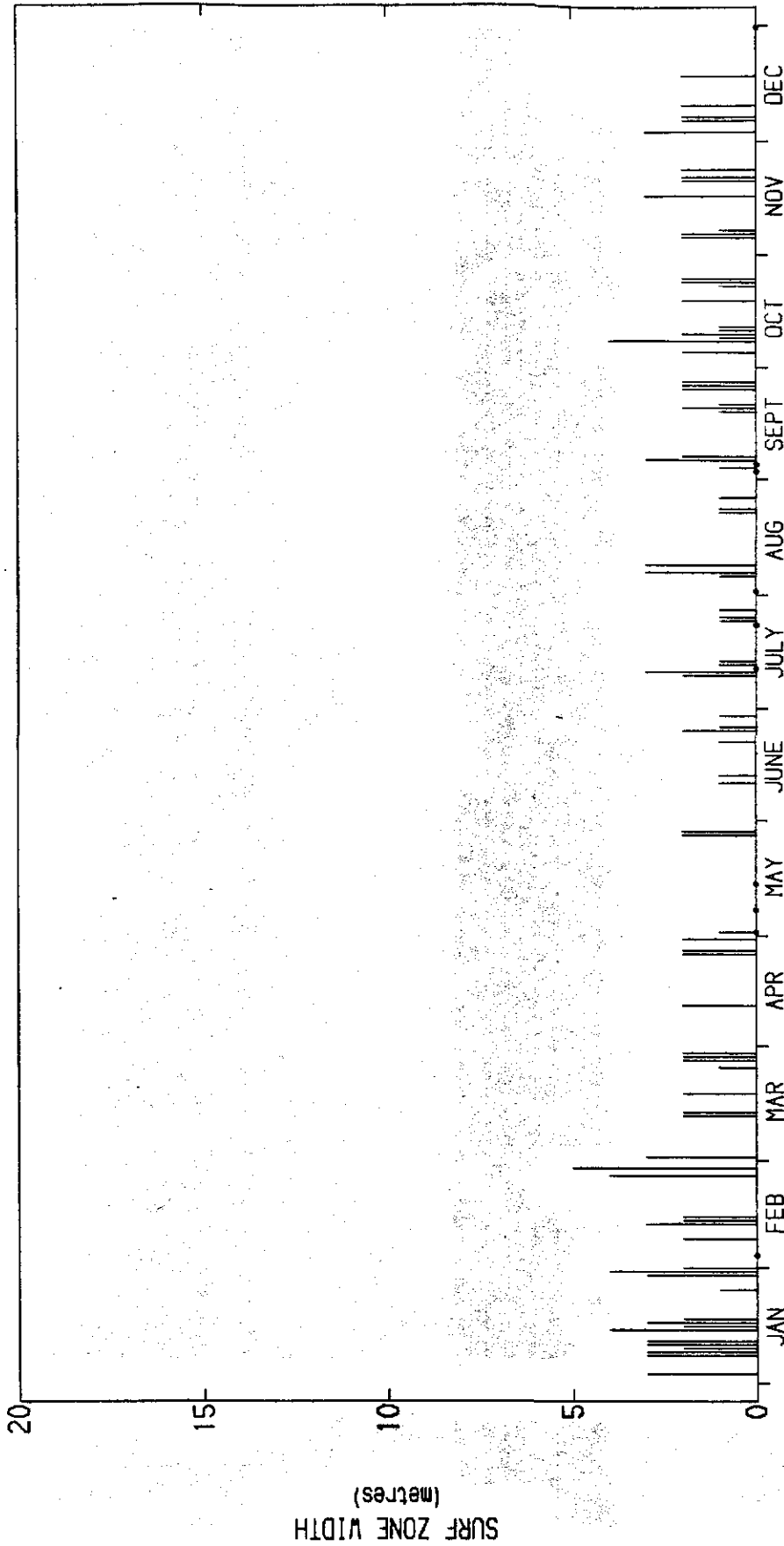
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SURF ZONE WIDTH SUMMARY - 1979

MORNING OBSERVATIONS

No. of Observations : 94

Mean Surf Zone Width = 1.8 m



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SURF ZONE WIDTH - MORNING 1979

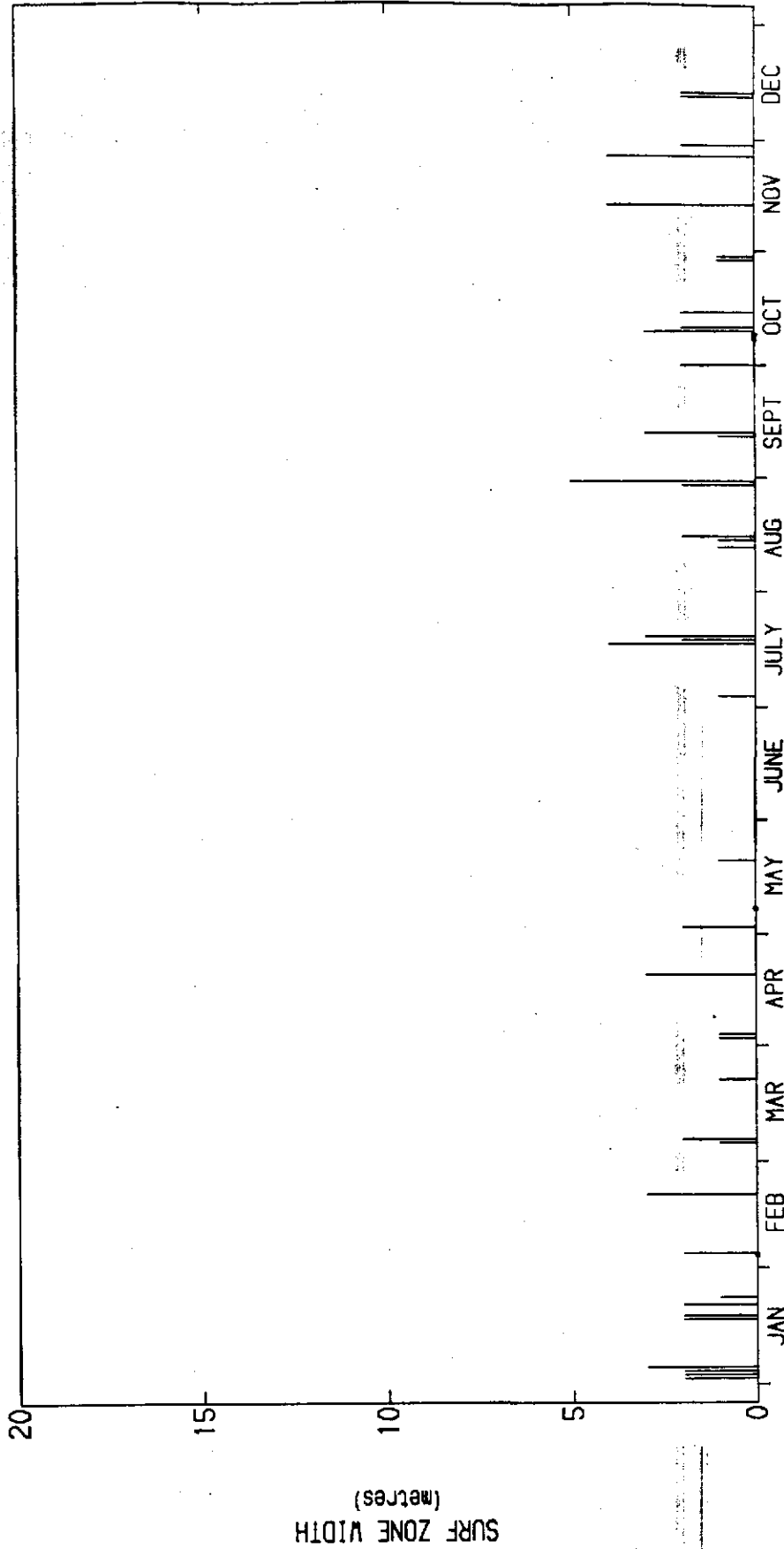
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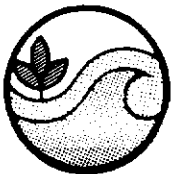
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SURF ZONE WIDTH SUMMARY - 1979

No. of Observations : 43 AFTERNOON OBSERVATIONS Mean Surf Zone Width = 1.9 m



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SURF ZONE WIDTH - AFTERNOON 1979

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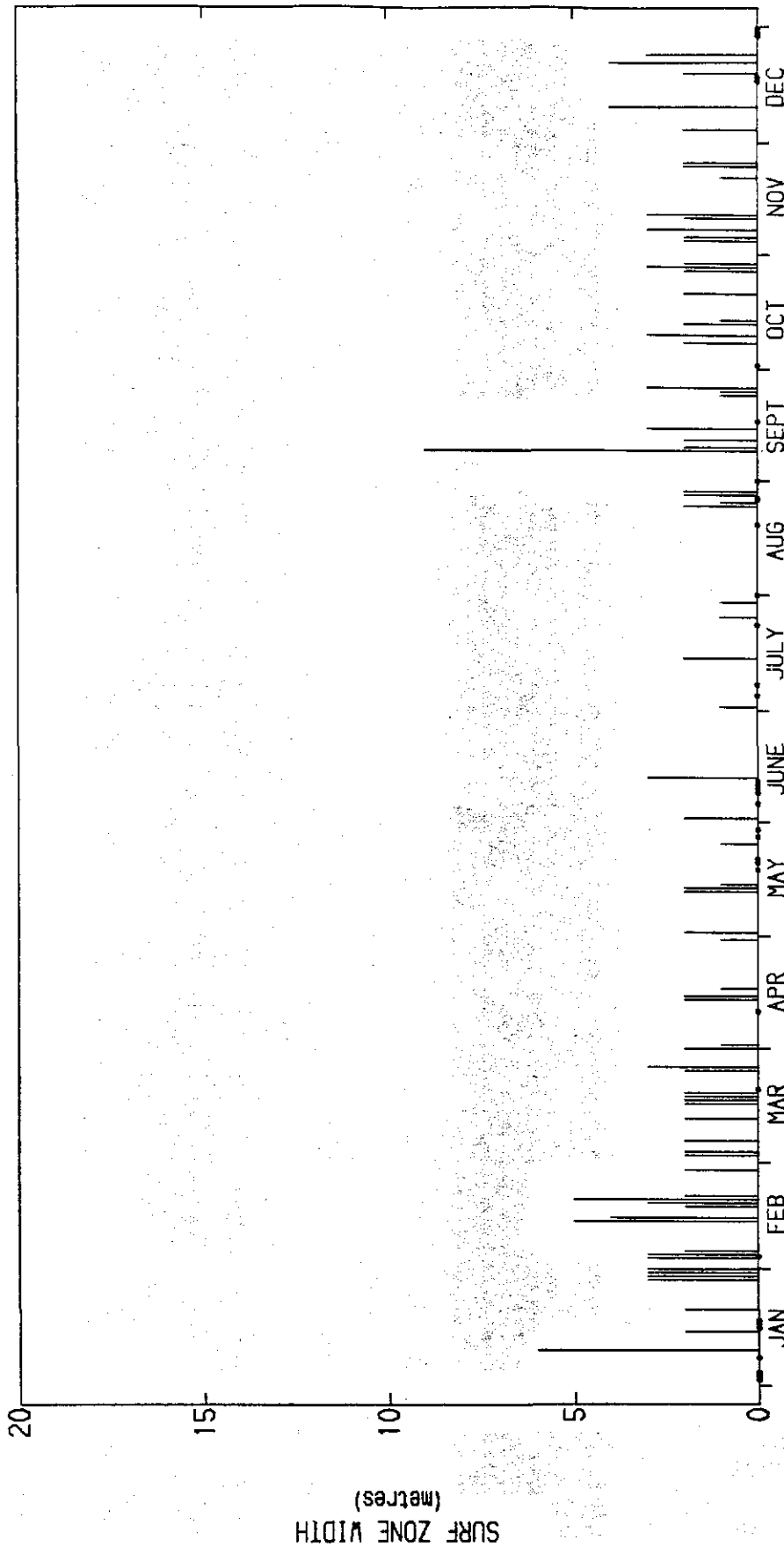
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SURF ZONE WIDTH SUMMARY - 1980

No. of Observations : 110

MORNING OBSERVATIONS

Mean Surf Zone Width = 1.6 m



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SURF ZONE WIDTH - MORNING 1980

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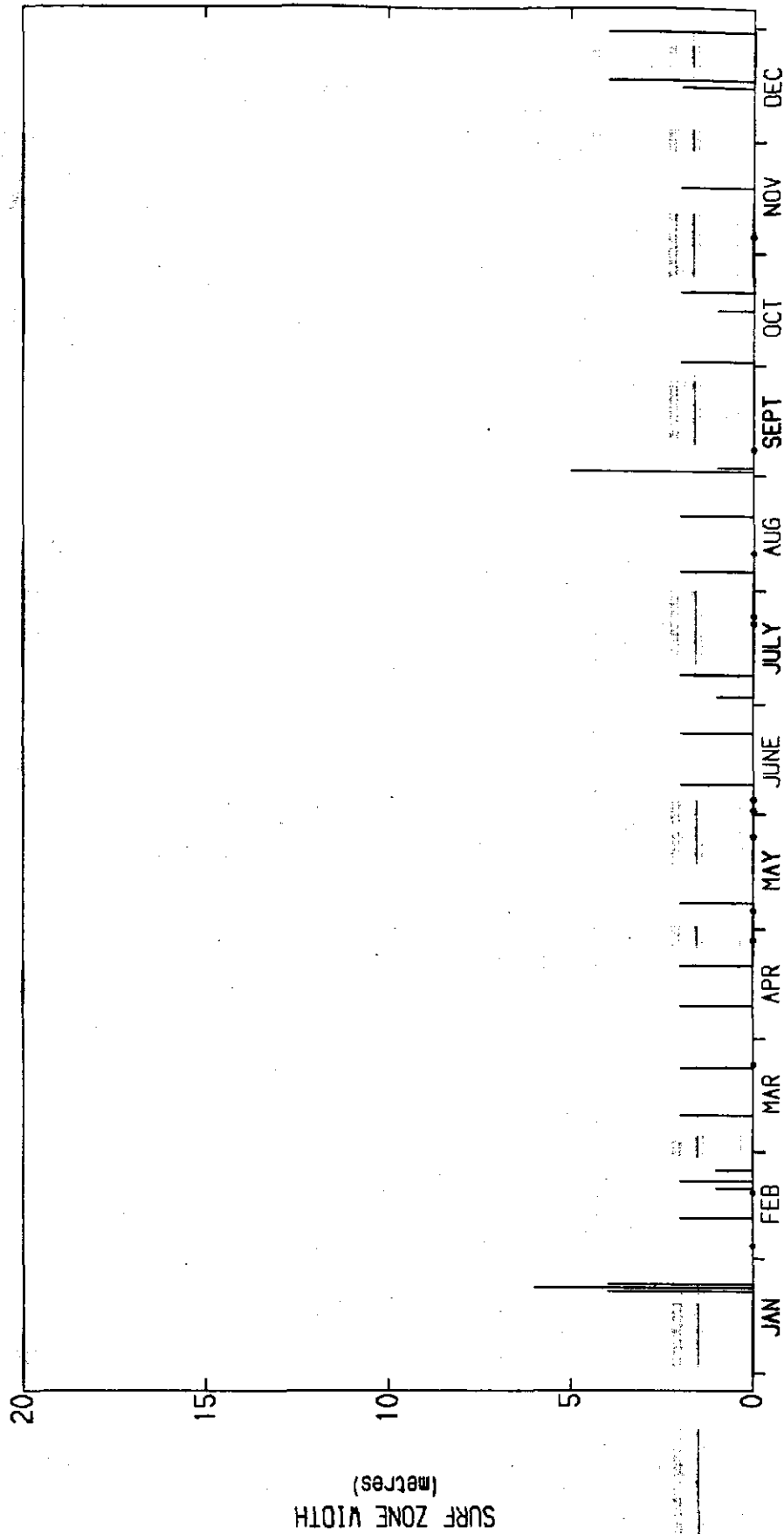
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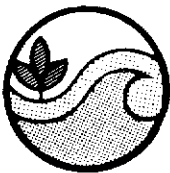


SURF ZONE WIDTH SUMMARY - 1980

No. of Observations : 39

AFTERNOON OBSERVATIONS

Mean Surf Zone Width = 1.6 m



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SURF ZONE WIDTH - AFTERNOON 1980

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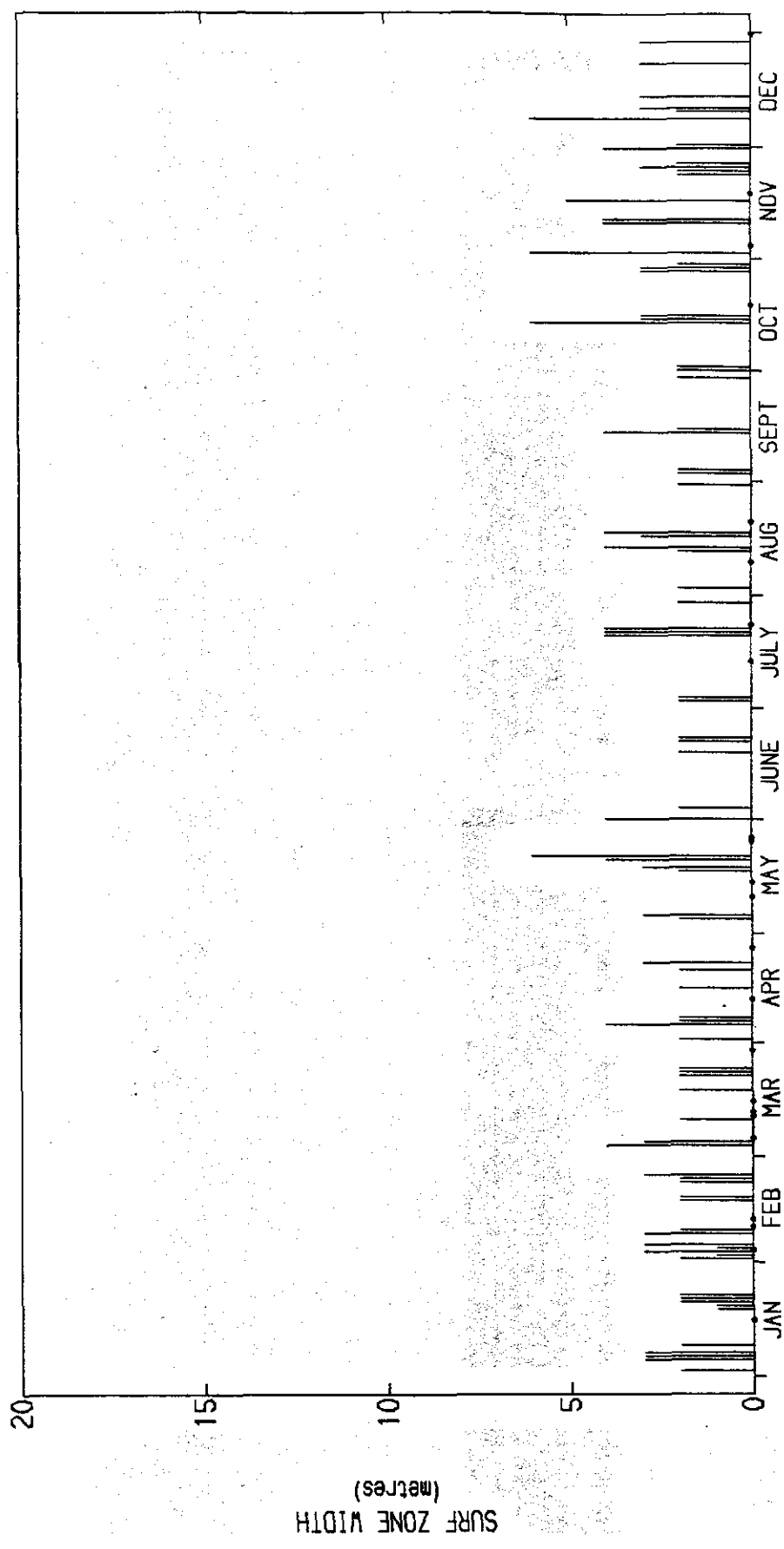
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SURF ZONE WIDTH SUMMARY - 1981

No. of Observations : 111

MORNING OBSERVATIONS

Mean Surf Zone Width = 2.2 m



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SURF ZONE WIDTH - MORNING 1981

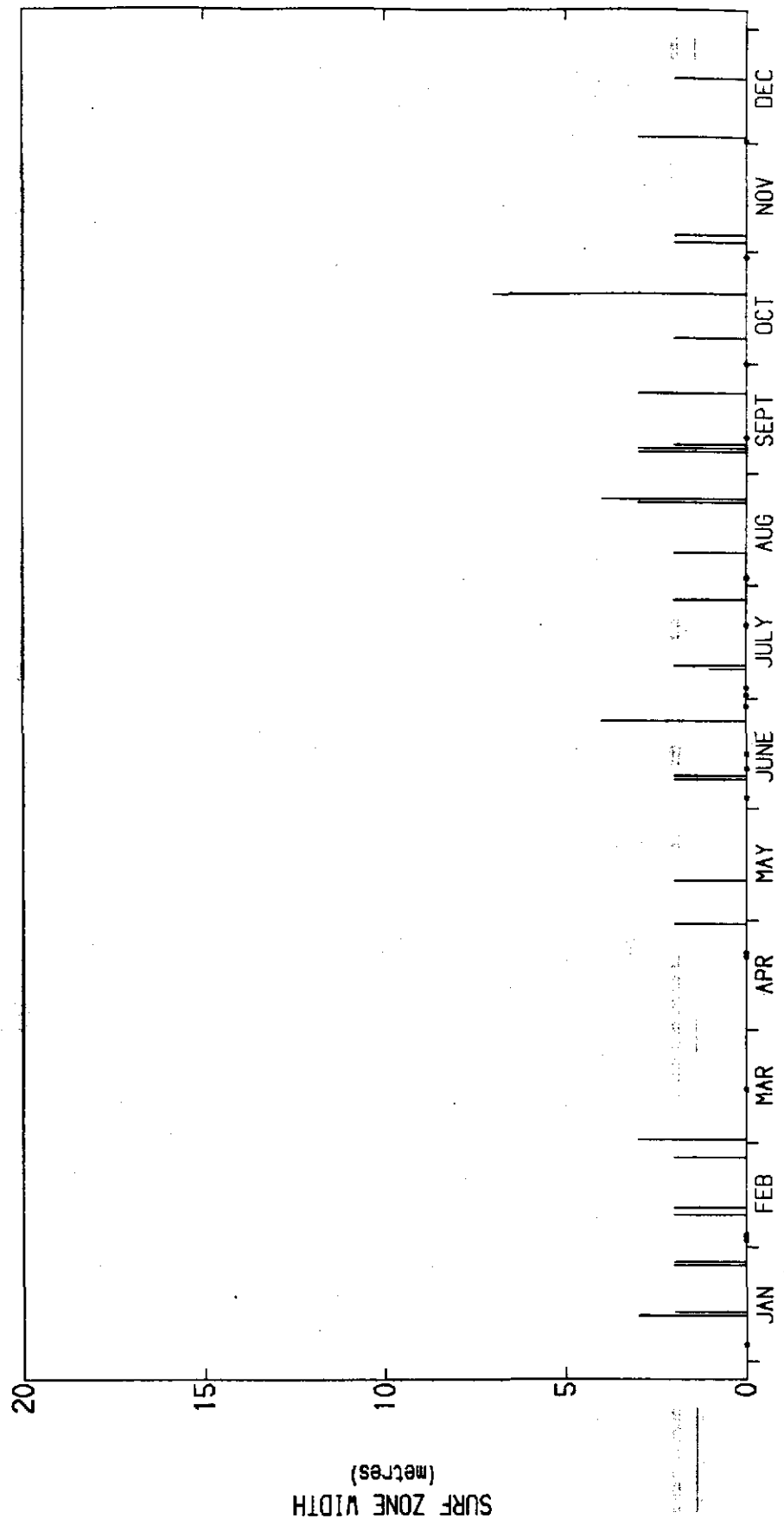
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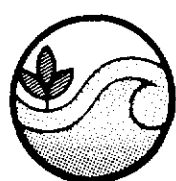


SURF ZONE WIDTH SUMMARY - 1981

No. of Observations : 48

AFTERNOON OBSERVATIONS

Mean Surf Zone Width = 1.5 m



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SURF ZONE WIDTH - AFTERNOON 1981

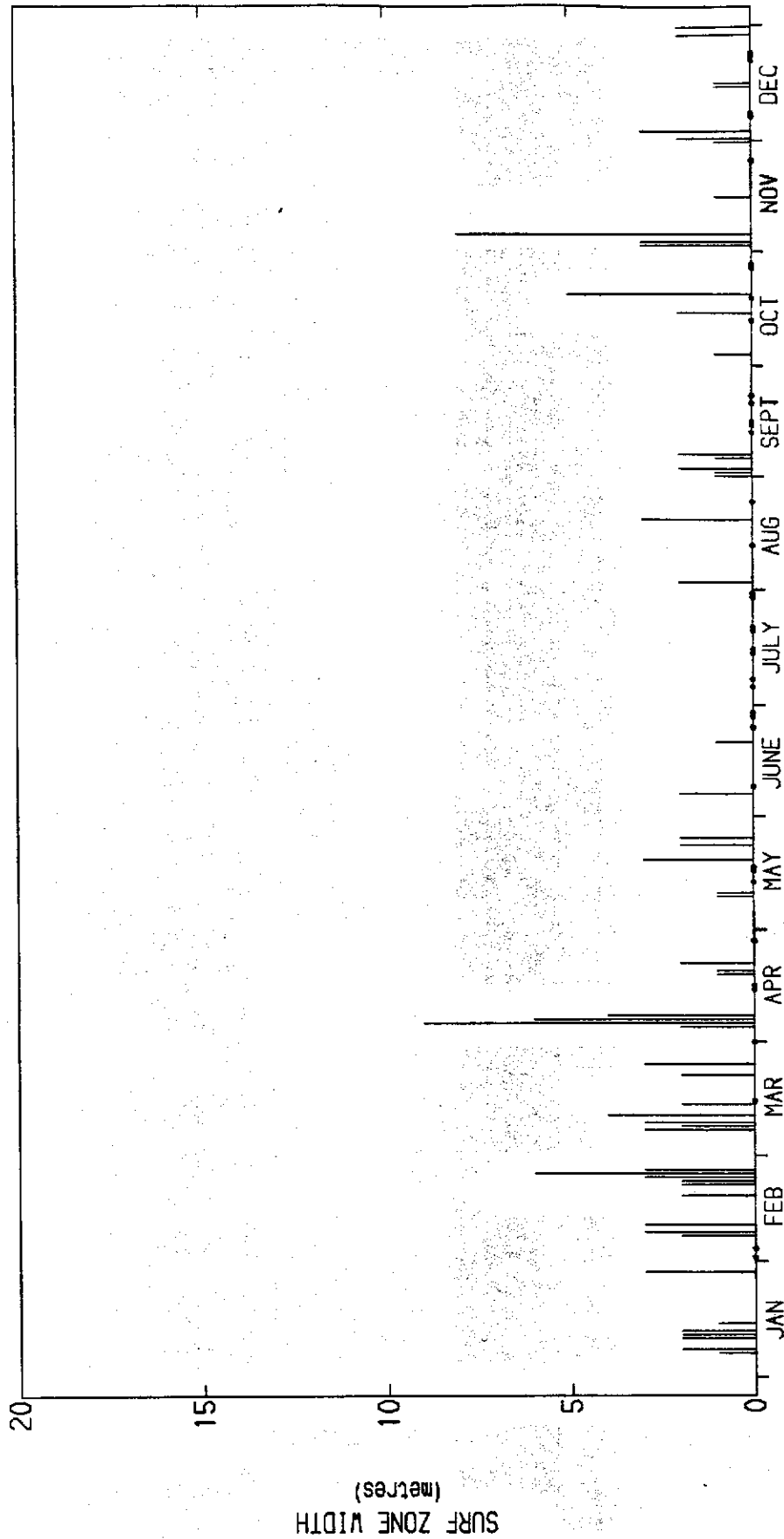
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SURF ZONE WIDTH SUMMARY - 1982

No. of Observations : 96

MORNING OBSERVATIONS

Mean Surf Zone Width = 1.5 m



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SURF ZONE WIDTH - MORNING 1982

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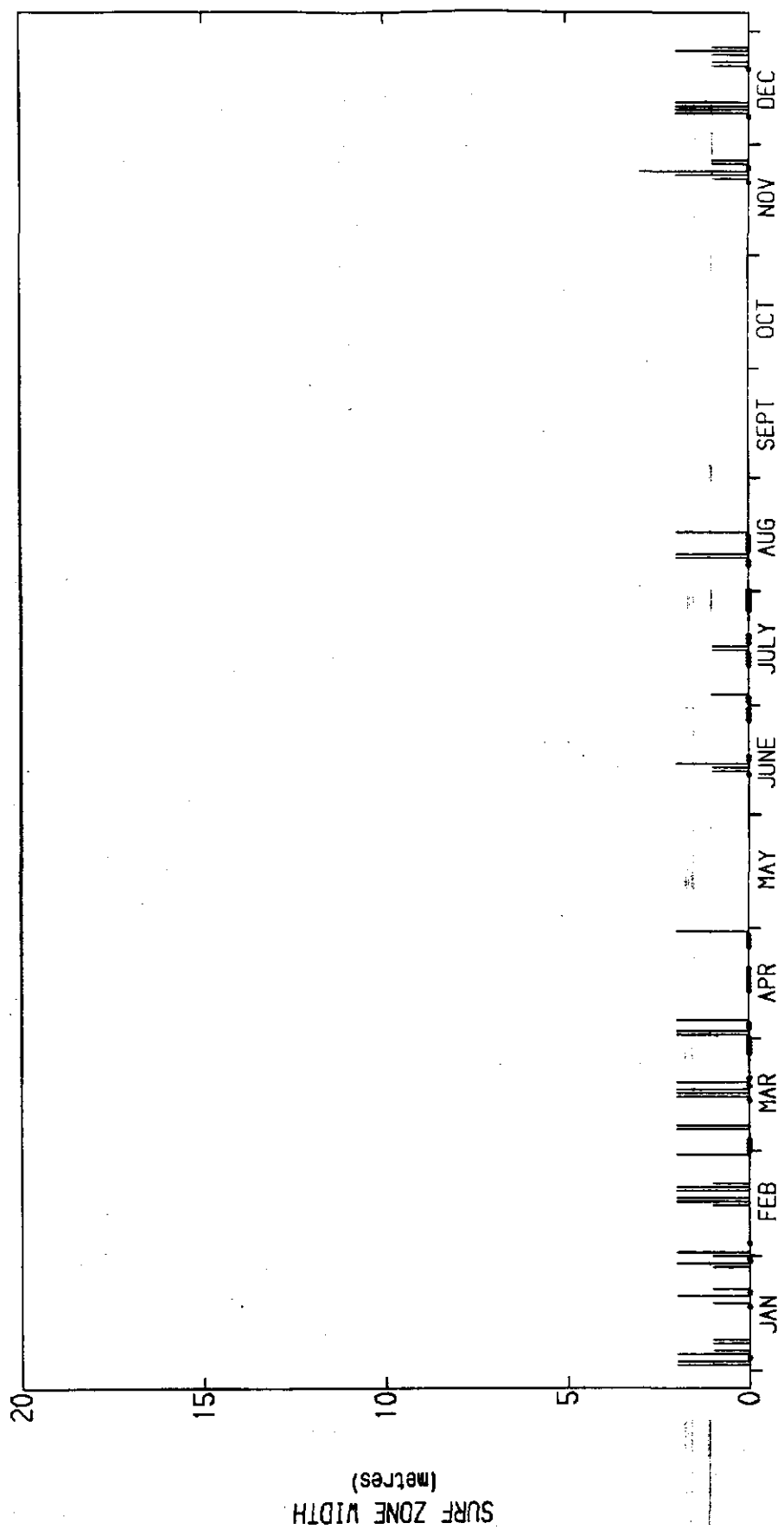
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SURF ZONE WIDTH SUMMARY - 1984

No. of Observations : 116

MORNING OBSERVATIONS

Mean Surf Zone Width = .7 m



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SURF ZONE WIDTH - MORNING 1984

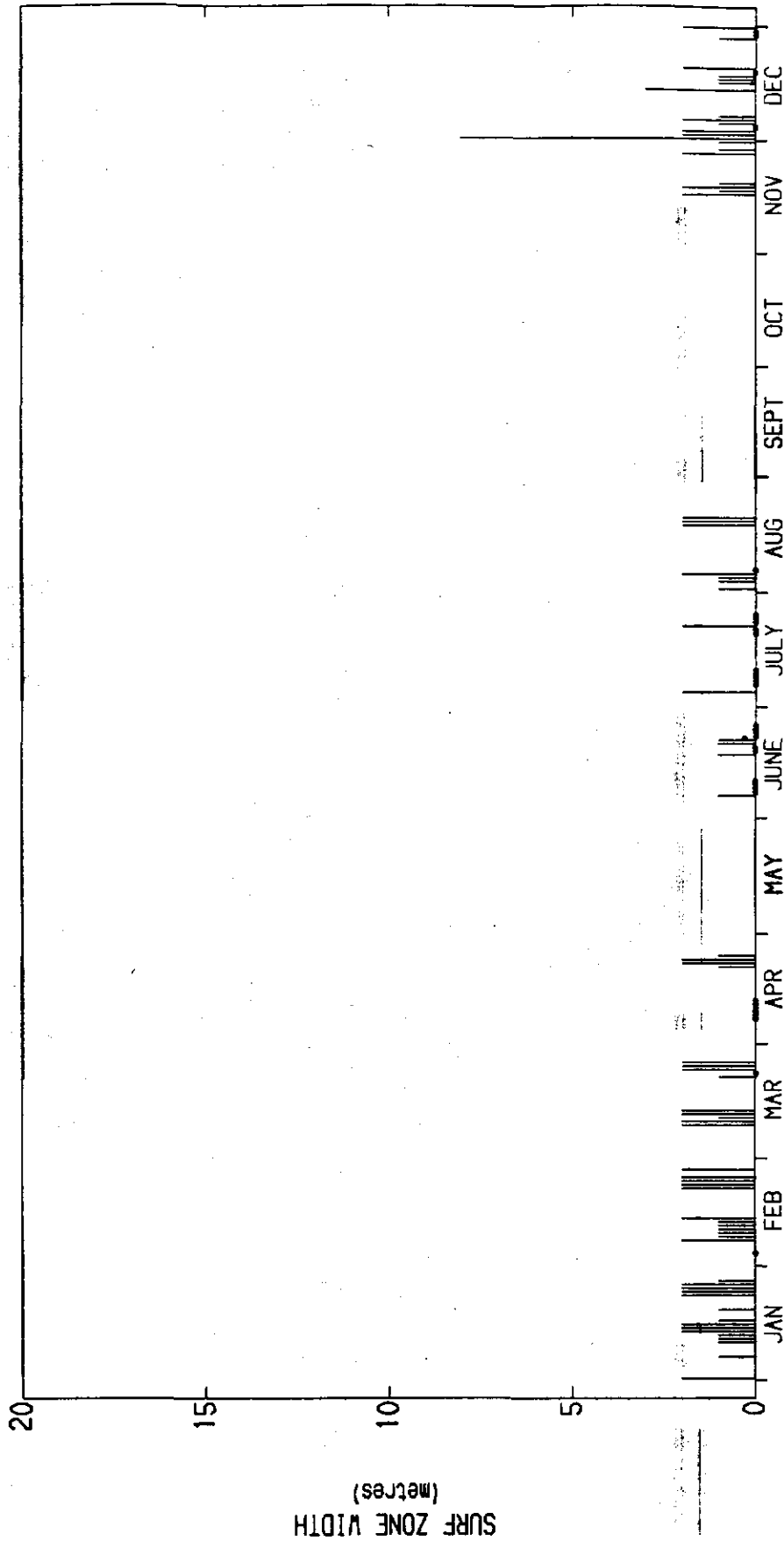
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SURF ZONE WIDTH SUMMARY - 1984

No. of Observations : 105

AFTERNOON OBSERVATIONS

Mean Surf Zone Width = 1.1 m



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SURF ZONE WIDTH - AFTERNOON 1984

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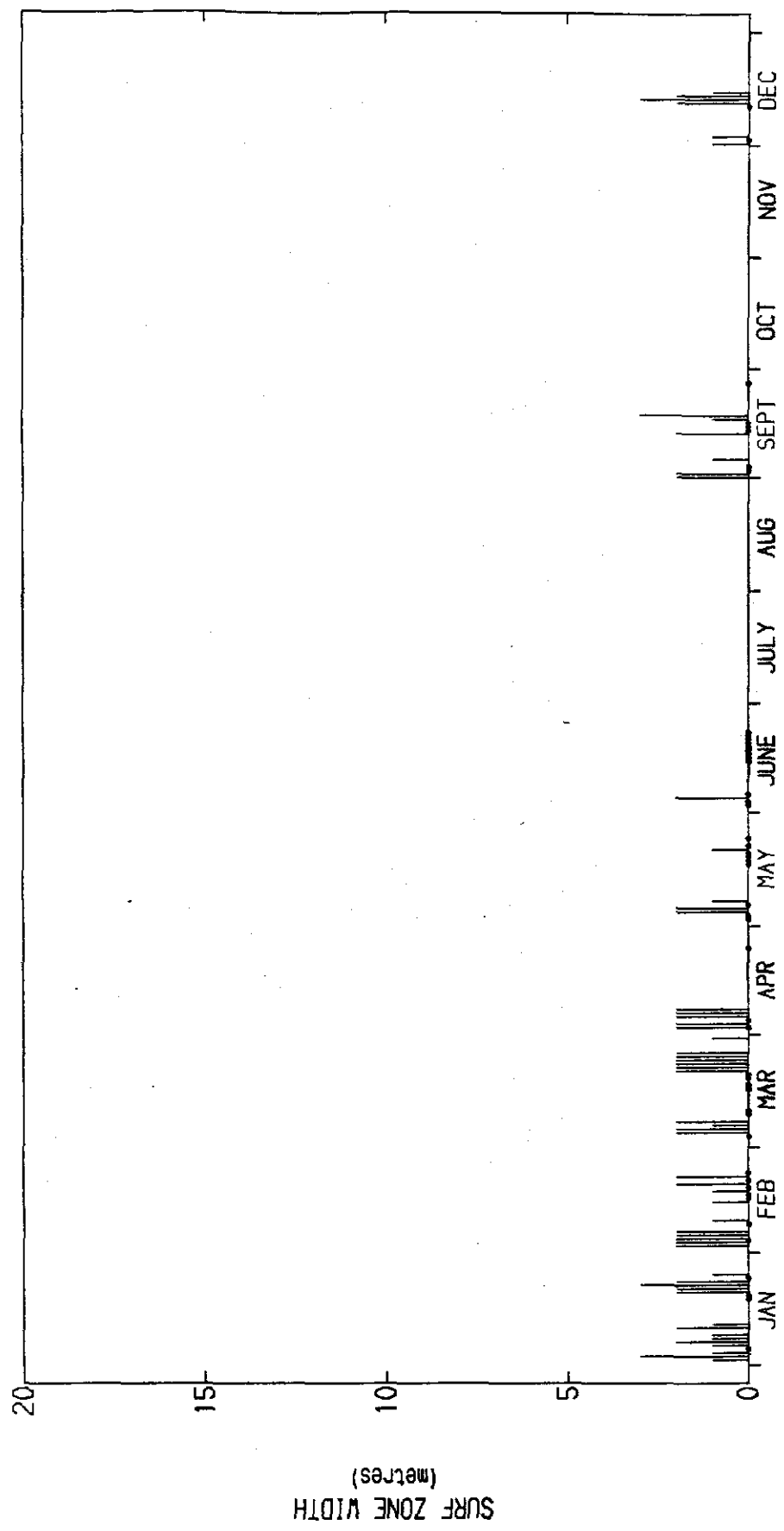
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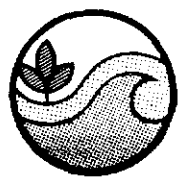


SURF ZONE WIDTH SUMMARY - 1985

Mean Surf Zone Width = 1.9 m

MORNING OBSERVATIONS

No. of Observations : 107



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SURF ZONE WIDTH - MORNING 1985

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SURF ZONE WIDTH - AFTERNOON 1985

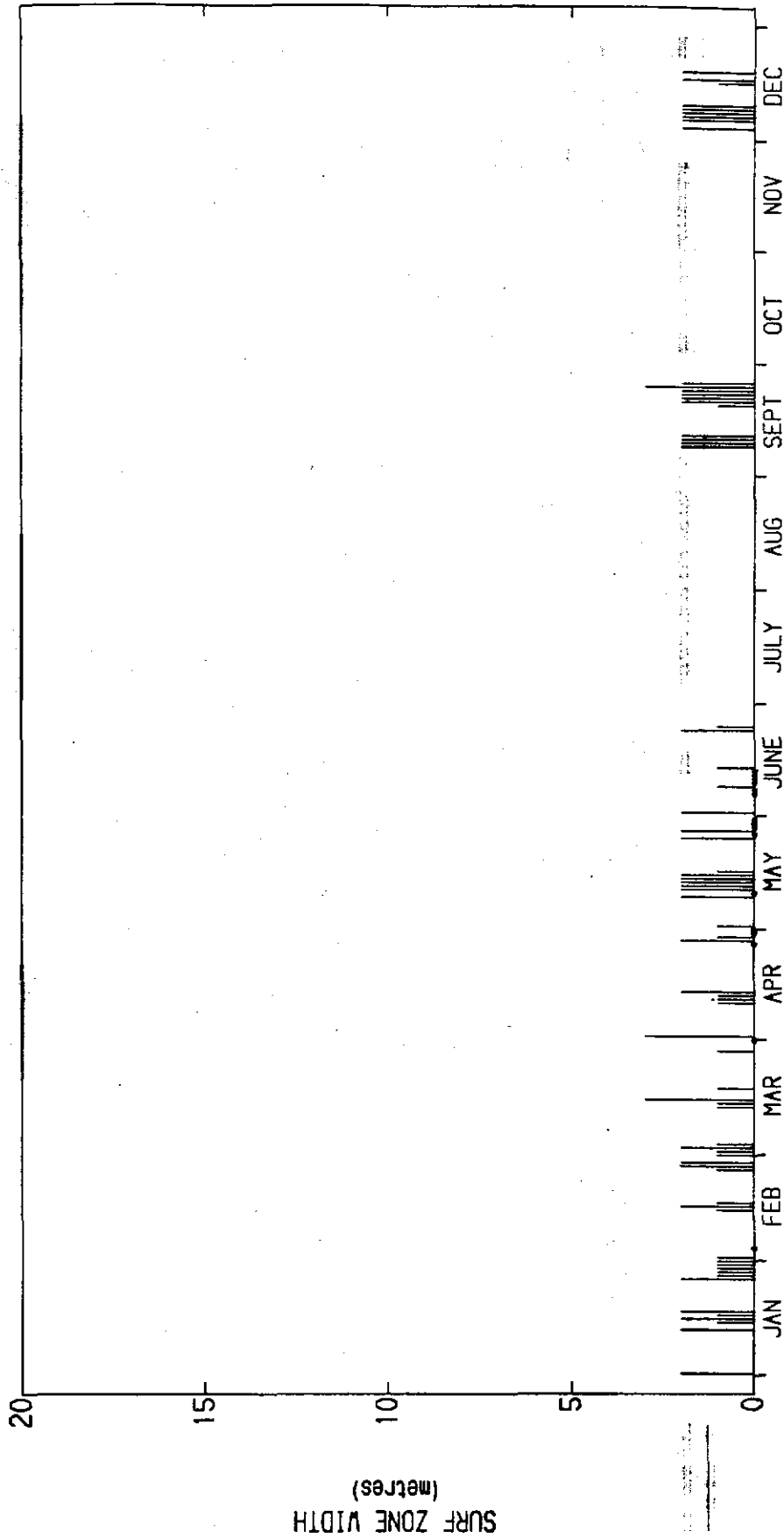
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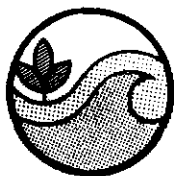


SURF ZONE WIDTH SUMMARY - 1985

No. of Observations : 85

AFTERNOON OBSERVATIONS

Mean Surf Zone Width = 1.3 m



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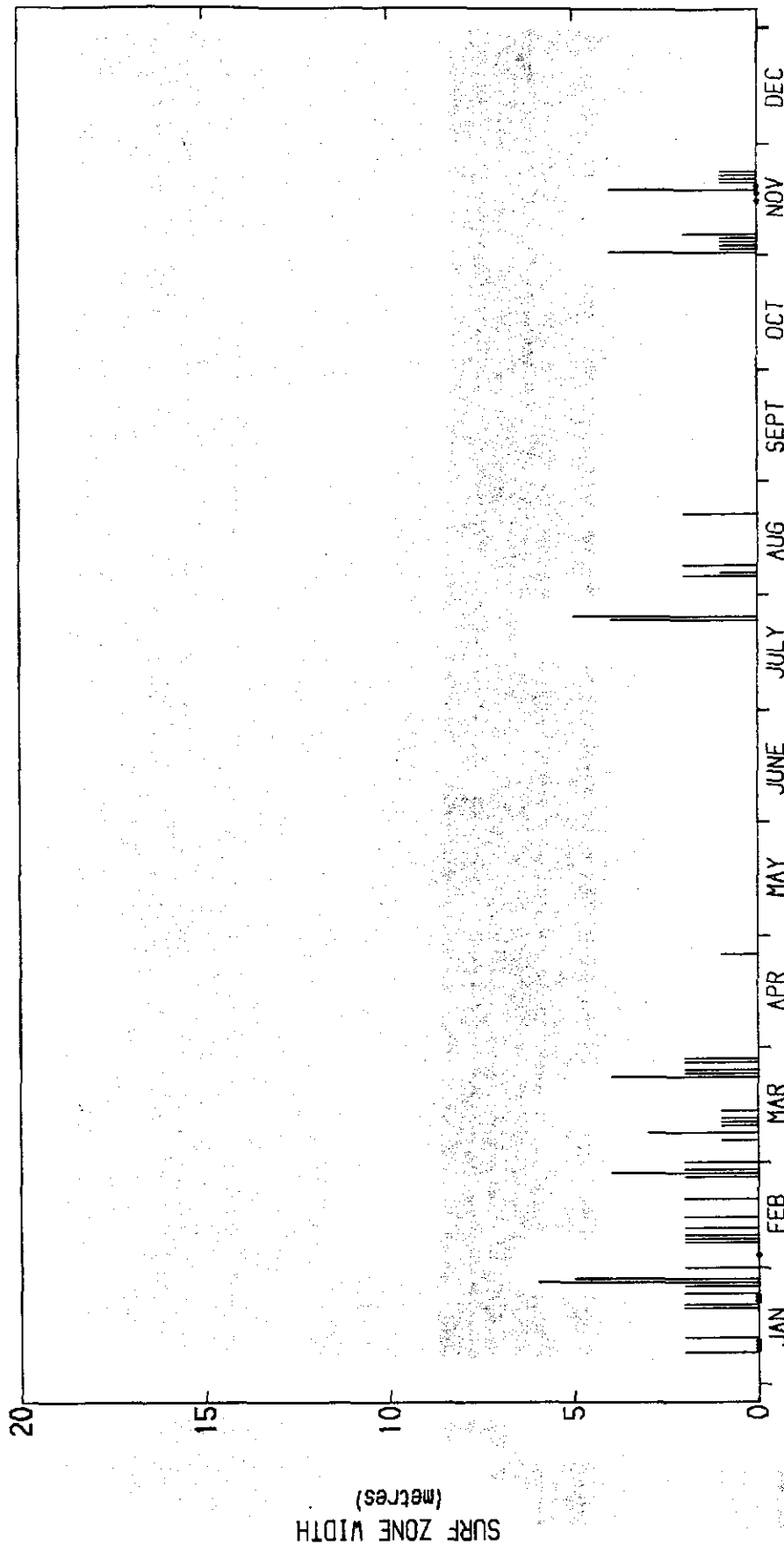
SURF ZONE WIDTH - MORNING 1986

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SURF ZONE WIDTH SUMMARY - 1986

No. of Observations : 56

MORNING OBSERVATIONS

Mean Surf Zone Width = 1.8 m

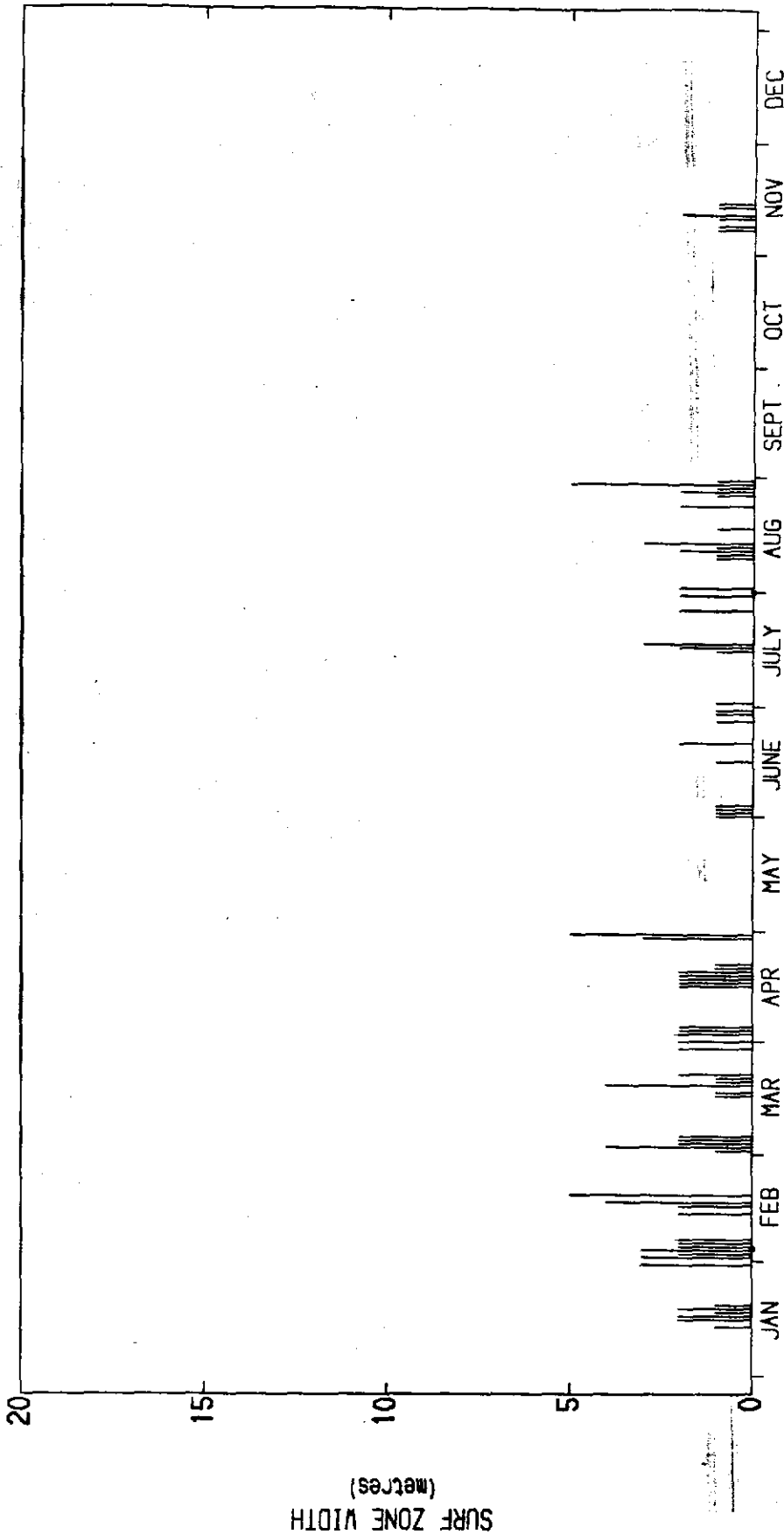
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SURF ZONE WIDTH SUMMARY - 1986

No. of Observations : 77

AFTERNOON OBSERVATIONS

Mean Surf Zone Width = 1.8 m



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SURF ZONE WIDTH - AFTERNOON 1986

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Figure

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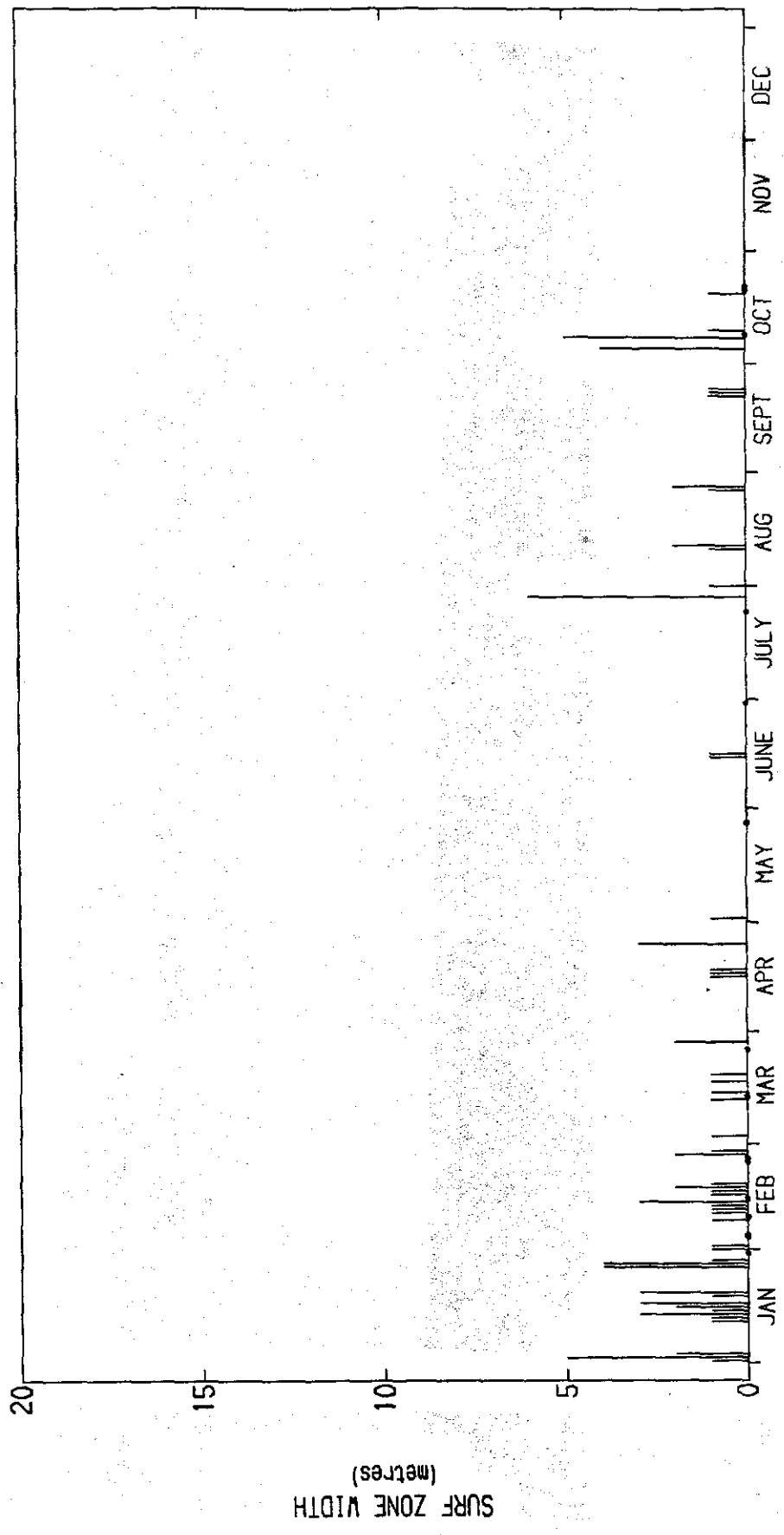
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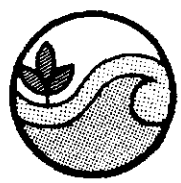
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SURF ZONE WIDTH SUMMARY - 1987

No. of Observations : 67 MORNING OBSERVATIONS Mean Surf Zone Width = 1.4 m



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SURF ZONE WIDTH - MORNING 1987

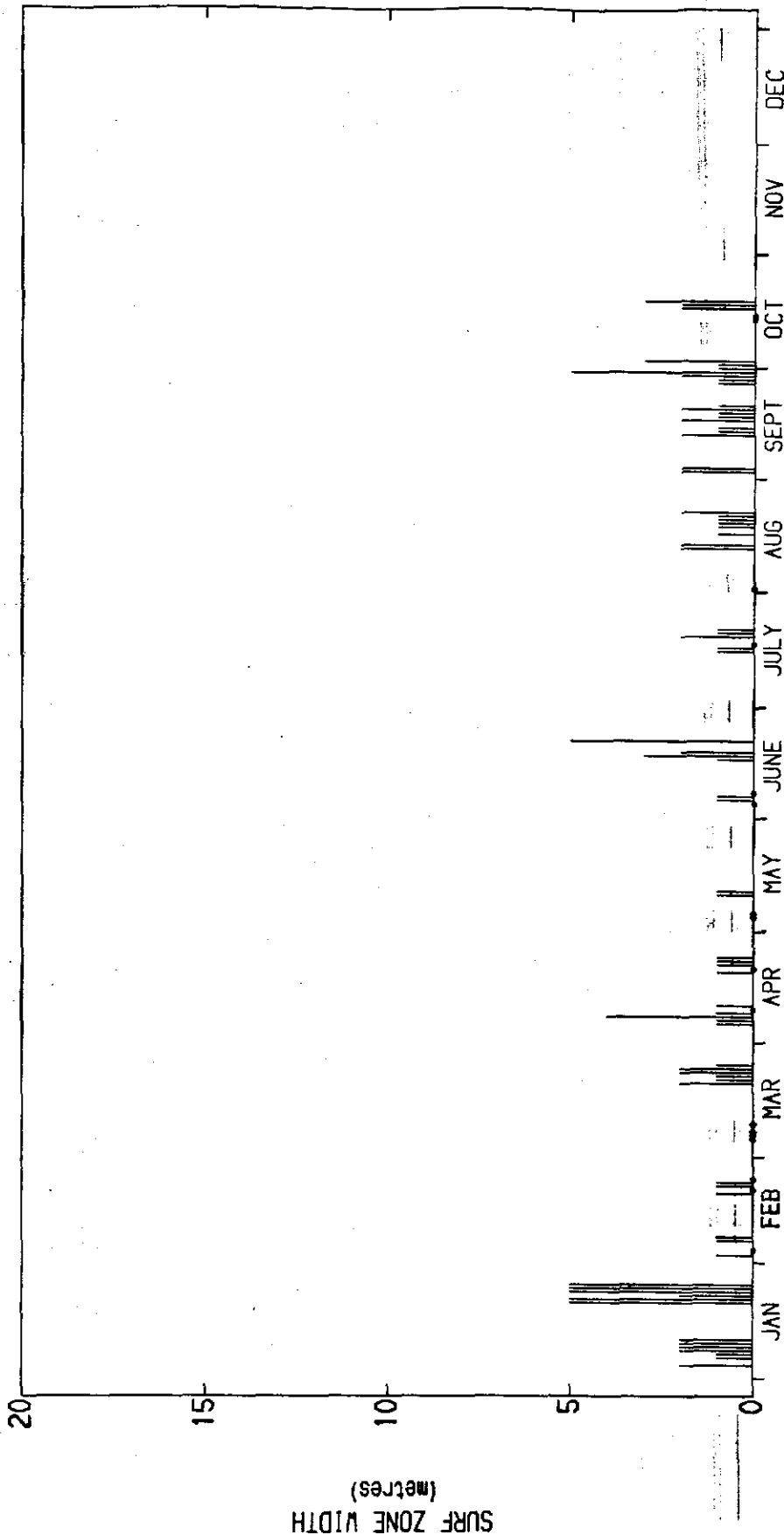
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SURF ZONE WIDTH SUMMARY - 1987

AFTERNOON OBSERVATIONS

No. of Observations : 91

Mean Surf Zone Width = 1.5 m



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SURF ZONE WIDTH - AFTERNOON 1987

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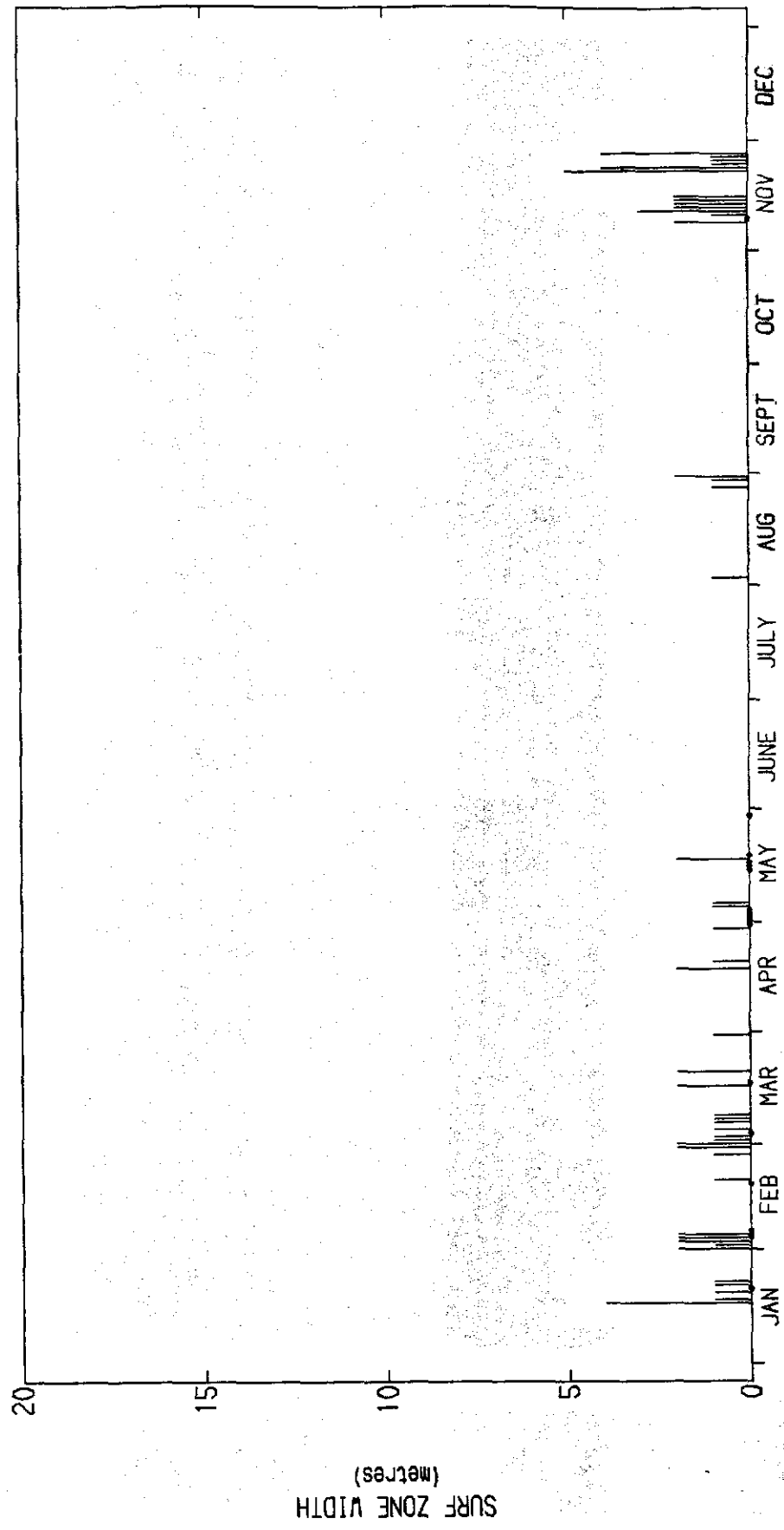
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SURF ZONE WIDTH SUMMARY - 1988

No. of Observations : 62

MORNING OBSERVATIONS

Mean Surf Zone Width = 1.2 m

||| Indicates Offshore Bar Present



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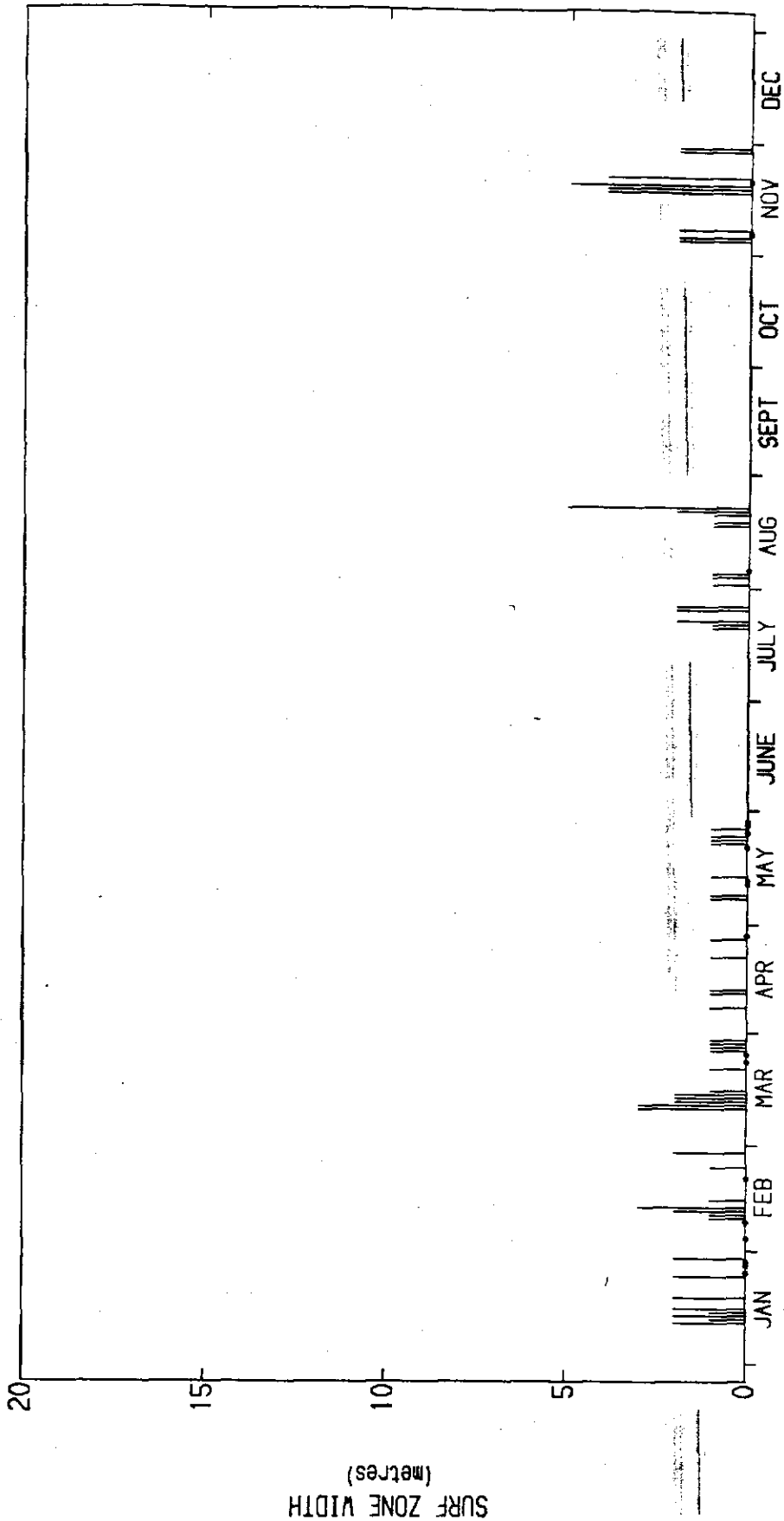
SURF ZONE WIDTH - MORNING 1988

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Figure
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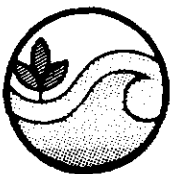
SURF ZONE WIDTH SUMMARY - 1988

No. of Observations : 77

AFTERNOON OBSERVATIONS

Mean Surf Zone Width = 1.3 m

▬▬▬ Indicates Offshore Bar Present



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SURF ZONE WIDTHS - AFTERNOON 1988

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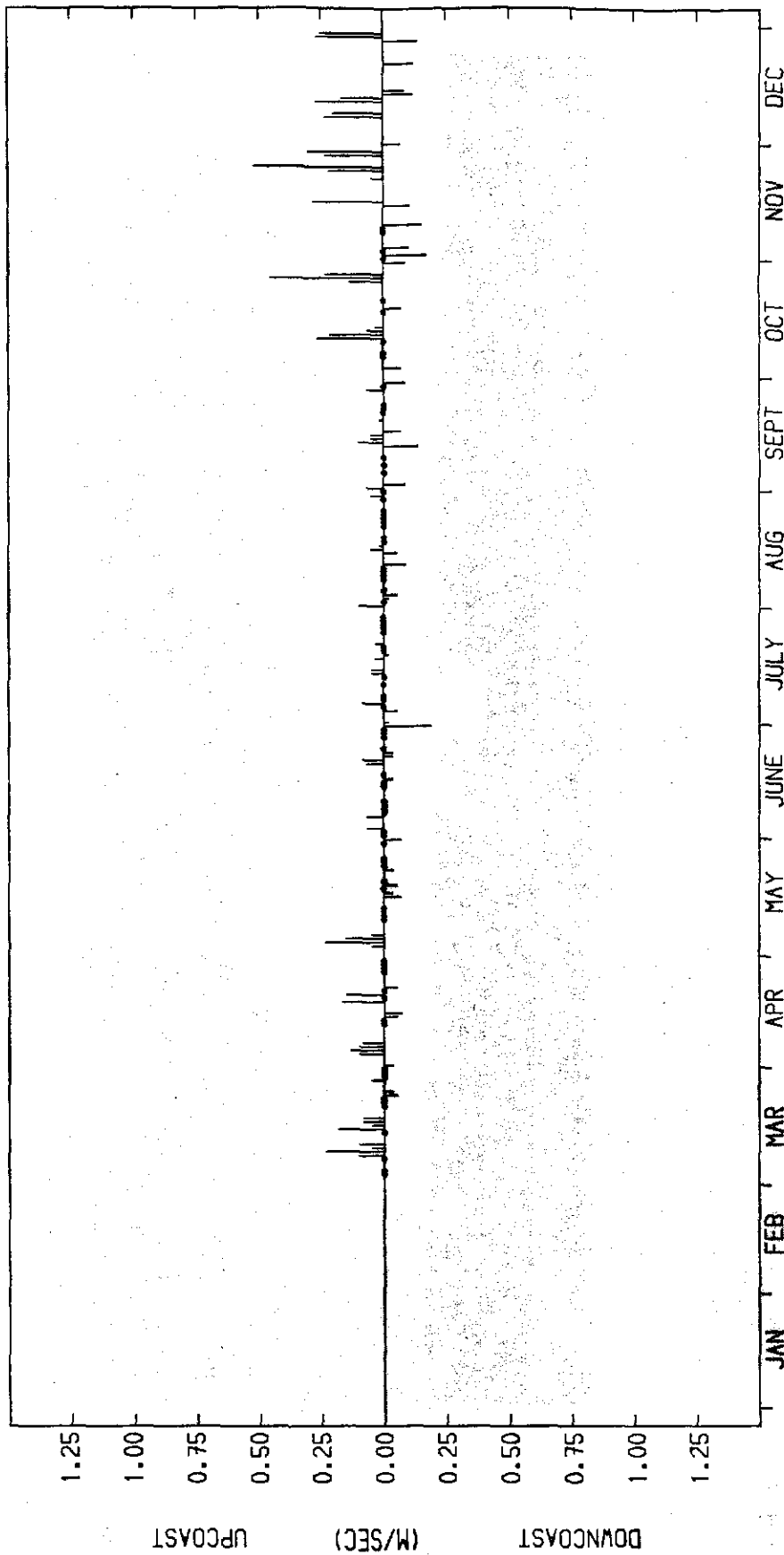
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LITTORAL CURRENT SUMMARY - 1977

MEAN VEL = .027 M/SEC (UP)

MEAN UP/COAST VEL = .134 M/SEC

MEAN DOWN/COAST VEL = .071 M/SEC

MORNING OBSERVATIONS - (179 RECORDINGS)



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LITTORAL CURRENTS - MORNING 1977

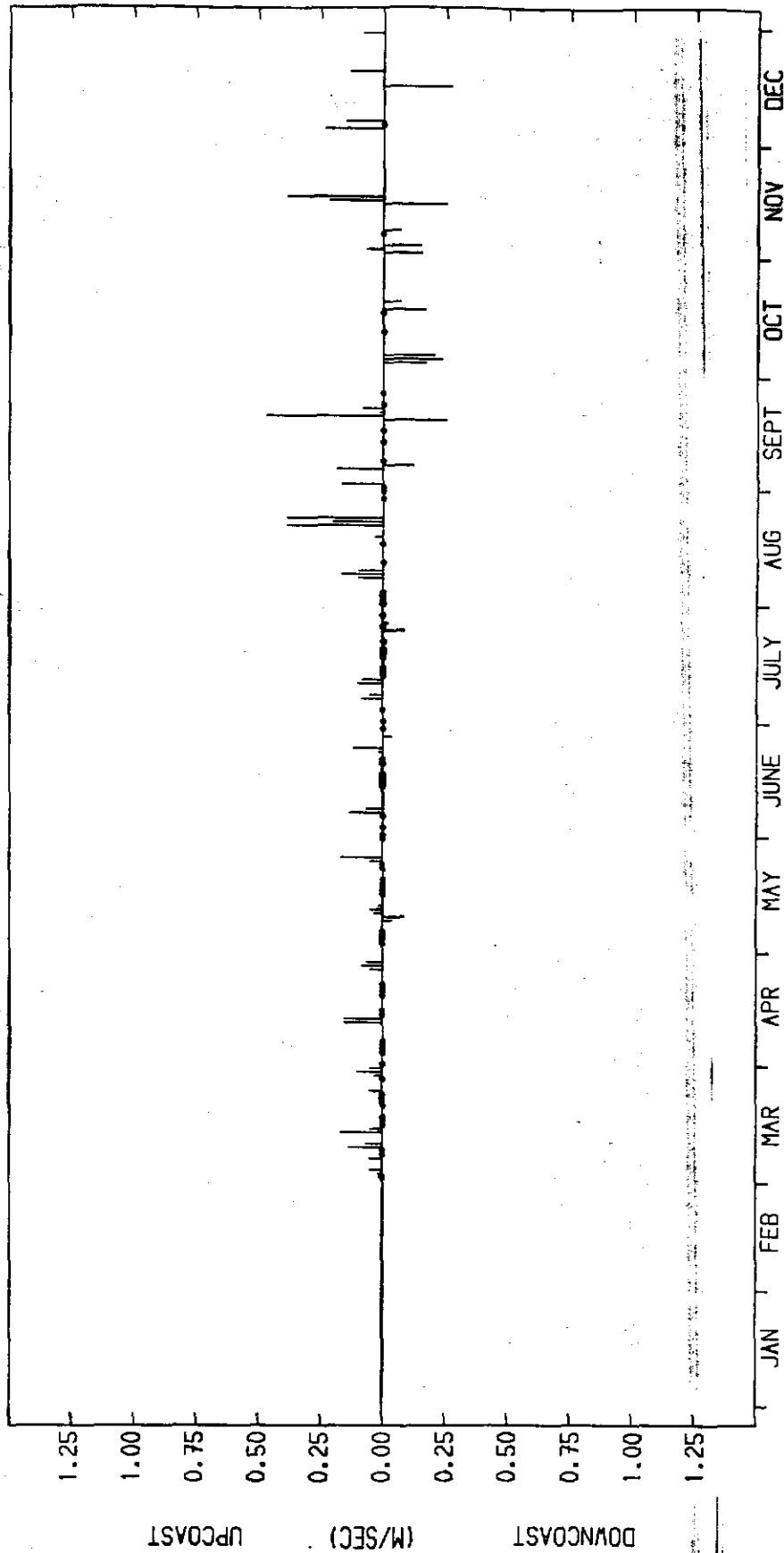
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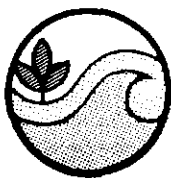
LITTORAL CURRENT SUMMARY - 1977

MEAN VEL = .025 M/SEC (UP)

MEAN UP/COAST VEL = .120 M/SEC

MEAN DOWN/COAST VEL = .137 M/SEC

AFTERNOON OBSERVATIONS - (138 RECORDINGS)



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LITTORAL CURRENTS - AFTERNOON 1977

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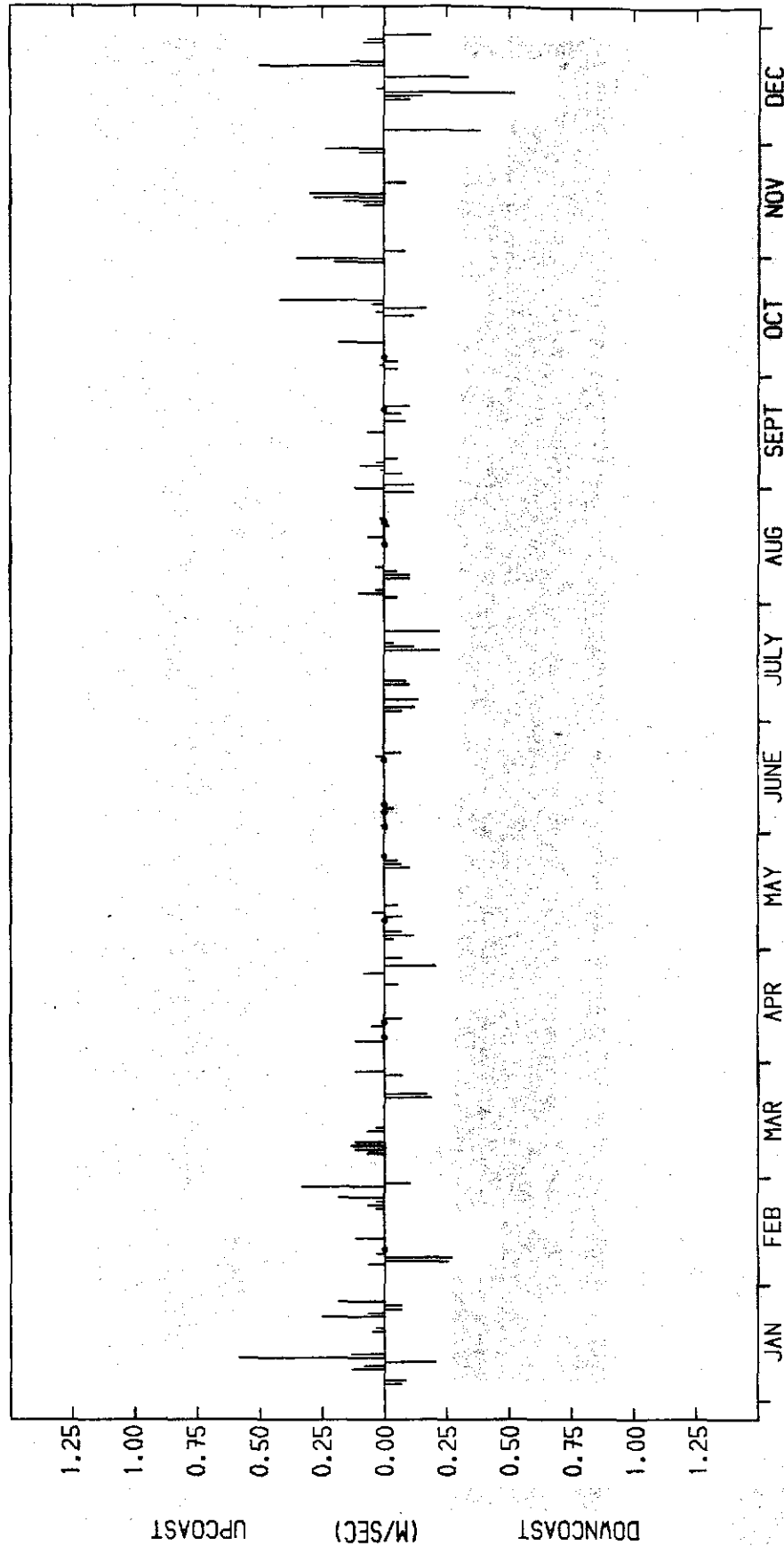
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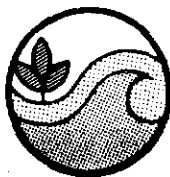
LITTORAL CURRENT SUMMARY - 1978

MEAN VEL = .003 M/SEC (UP)

MEAN UPCOAST VEL = .126 M/SEC

MEAN DOWNCOAST VEL = .117 M/SEC

MORNING OBSERVATIONS - (128 RECORDINGS)



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LITTORAL CURRENTS - MORNING 1978

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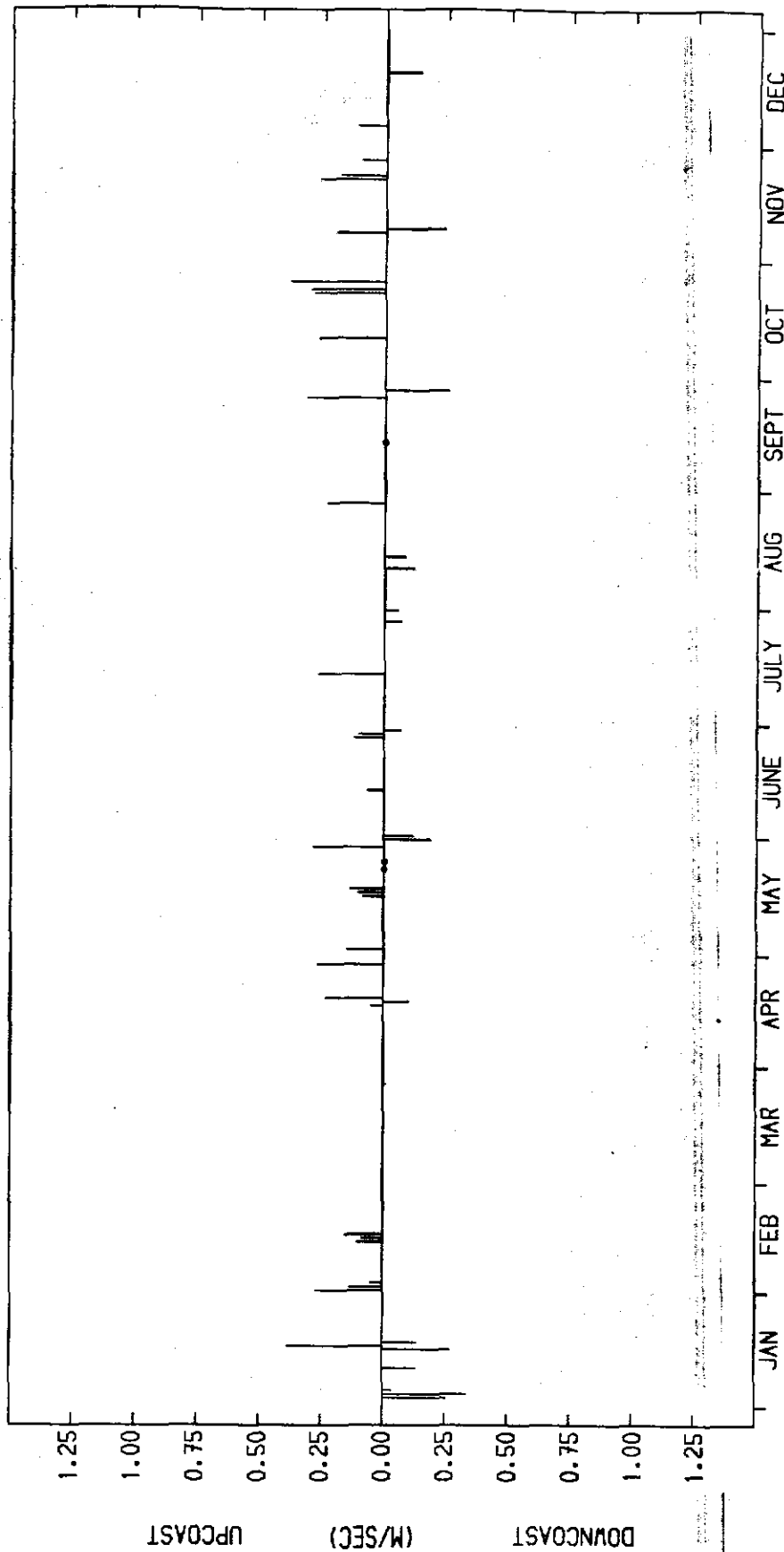
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LITTORAL CURRENT SUMMARY - 1978

MEAN VEL = .062 M/SEC (UP)

MEAN UP/COAST VEL = .189 M/SEC

MEAN DOWN/COAST VEL = .150 M/SEC

AFTERNOON OBSERVATIONS - (50 RECORDINGS)



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LITTORAL CURRENTS - AFTERNOON 1978

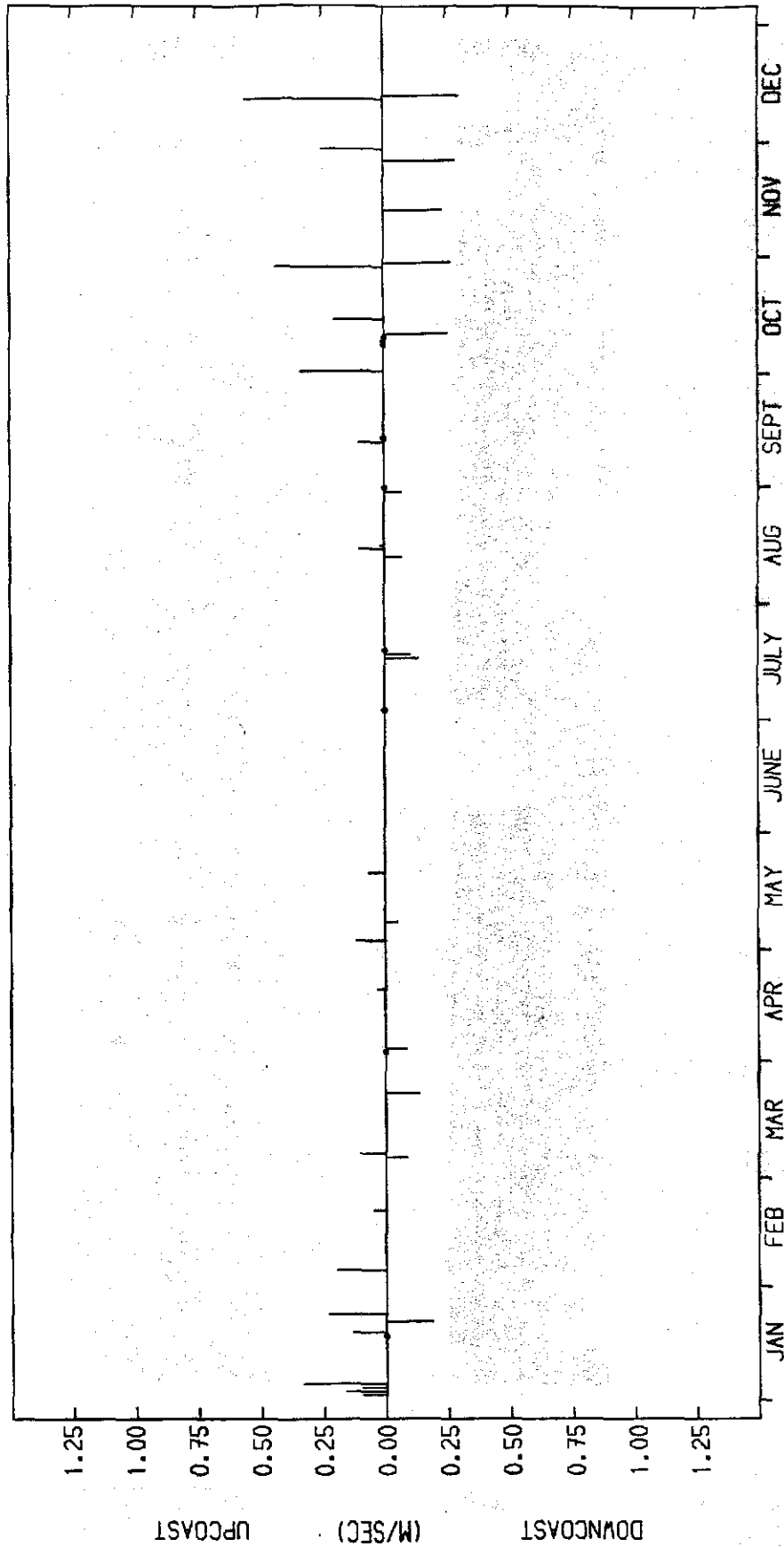
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LITTORAL CURRENT SUMMARY - 1979

MEAN VEL = .032 M/SEC (UP)

MEAN UP-CAST VEL = .181 M/SEC

MEAN DOWN-CAST VEL = .160 M/SEC

AFTERNOON OBSERVATIONS - (43 RECORDINGS)



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LITTORAL CURRENTS - MORNING 1979

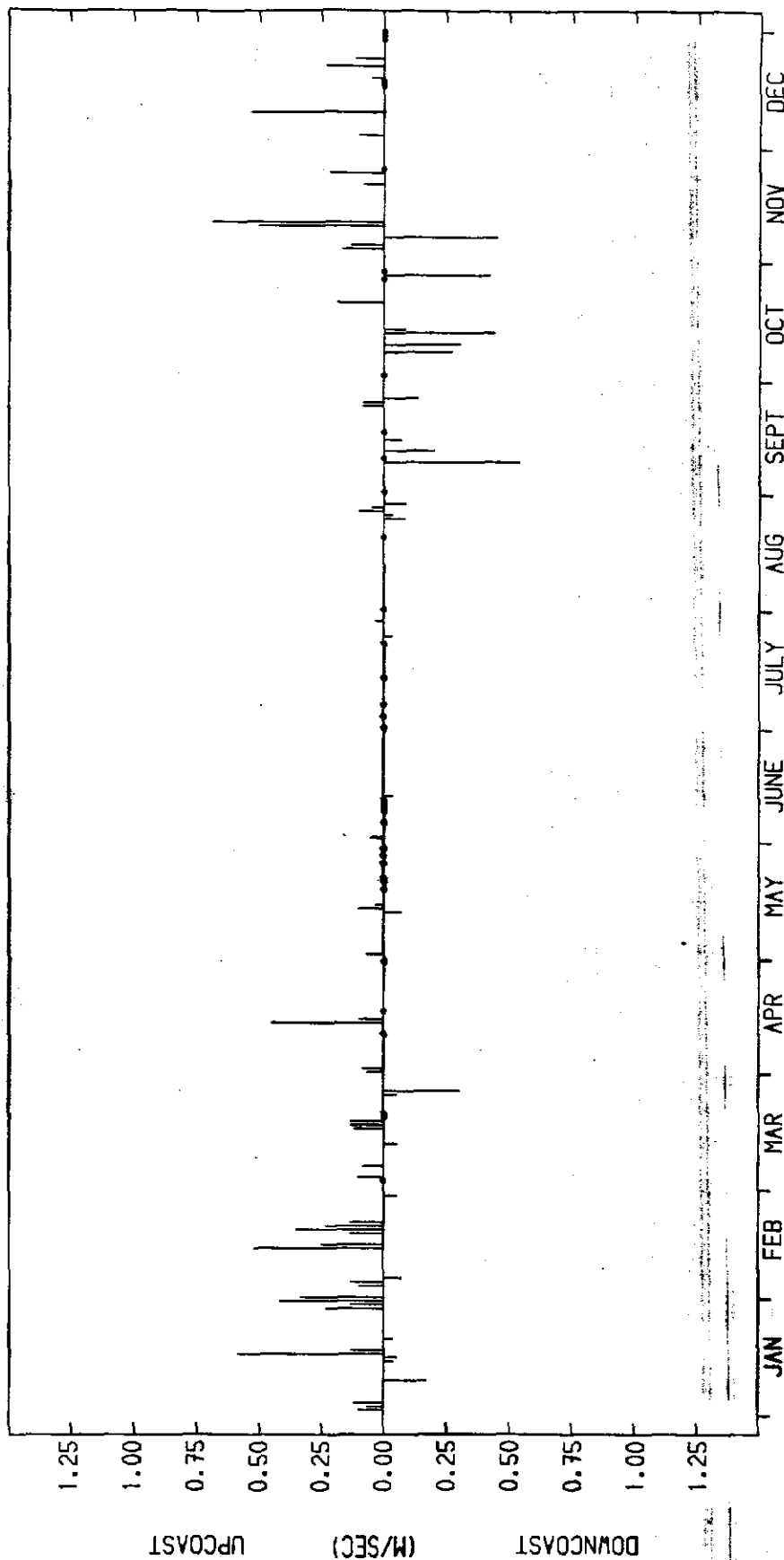
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LITTORAL CURRENT SUMMARY - 1980

MEAN VEL = .044 M/SEC (UP) MEAN UPCOAST VEL = .188 M/SEC MEAN DOWNCOAST VEL = .161 M/SEC
MORNING OBSERVATIONS - (109 RECORDINGS)



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LITTORAL CURRENTS - MORNING 1980

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Figure

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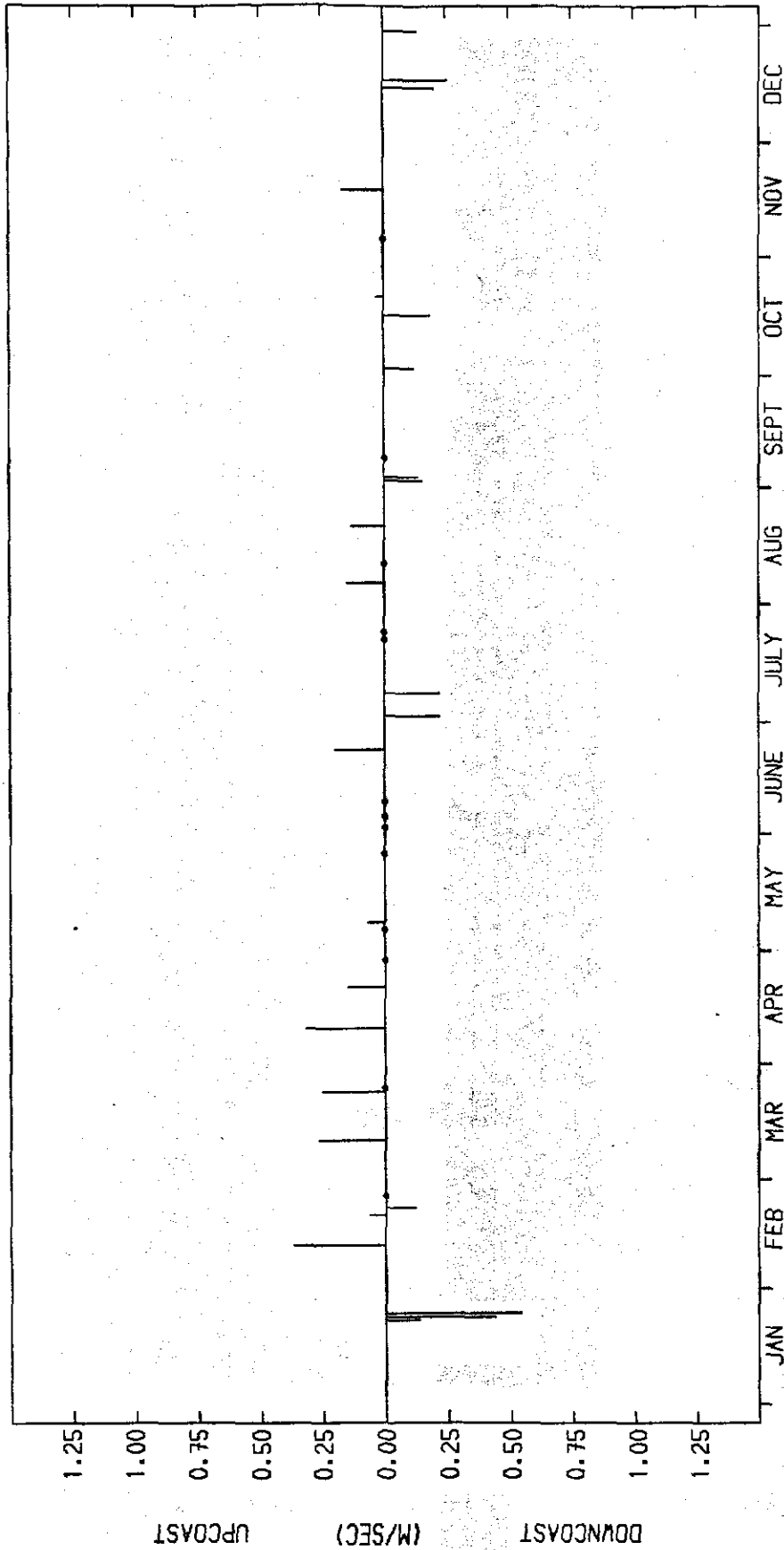
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LITTORAL CURRENT SUMMARY - 1980

MEAN VEL = -.017 M/SEC (DOWN)

MEAN UP/COAST VEL = .181 M/SEC

MEAN DOWN/COAST VEL = .217 M/SEC

AFTERNOON OBSERVATIONS - (38 RECORDINGS)



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LITTORAL CURRENTS - AFTERNOON 1980

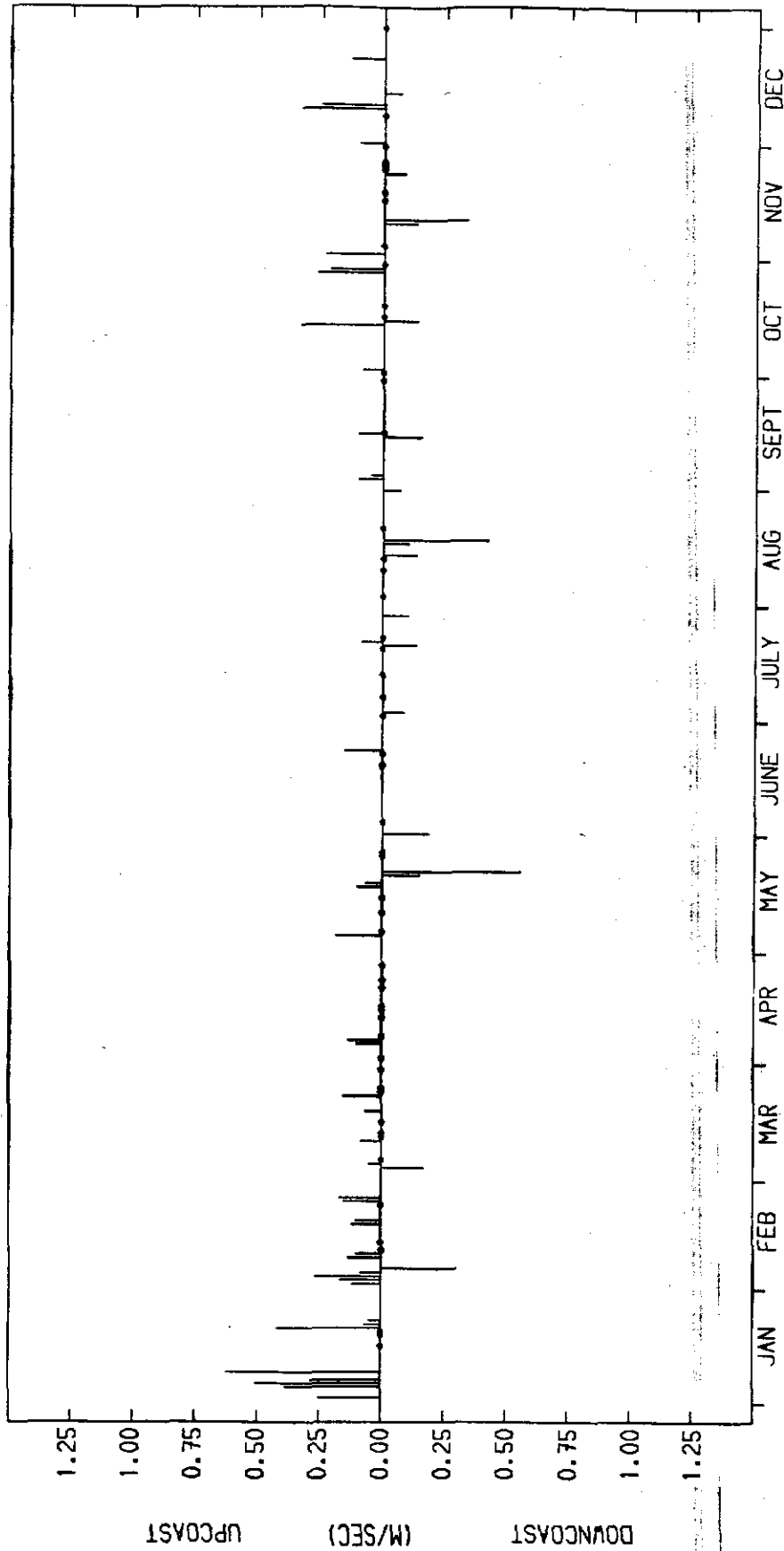
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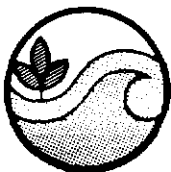
LITTORAL CURRENT SUMMARY - 1981

MEAN VEL = .036 M/SEC (UP)

MEAN UPCOAST VEL = .179 M/SEC

MEAN DOWNCOAST VEL = .182 M/SEC

MORNING OBSERVATIONS - (112 RECORDINGS)



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LITTORAL CURRENTS - MORNING 1981

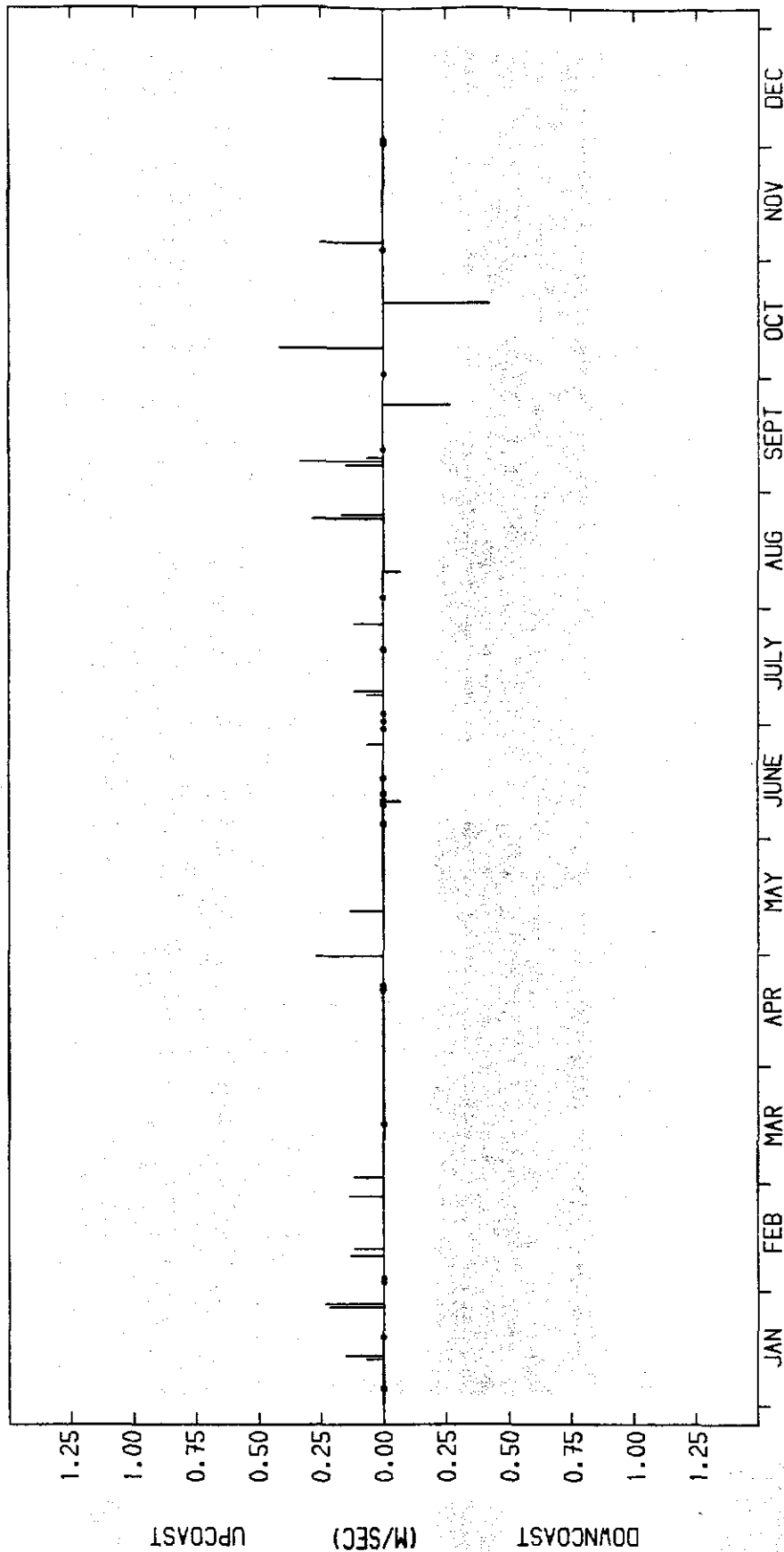
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LITTORAL CURRENT SUMMARY - 1981

MEAN VEL = .062 M/SEC (UP)

MEAN UPCAST VEL = .173 M/SEC

MEAN DOWNCAST VEL = .204 M/SEC

AFTERNOON OBSERVATIONS - (48 RECORDINGS)



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LITTORAL CURRENTS - AFTERNOON 1981

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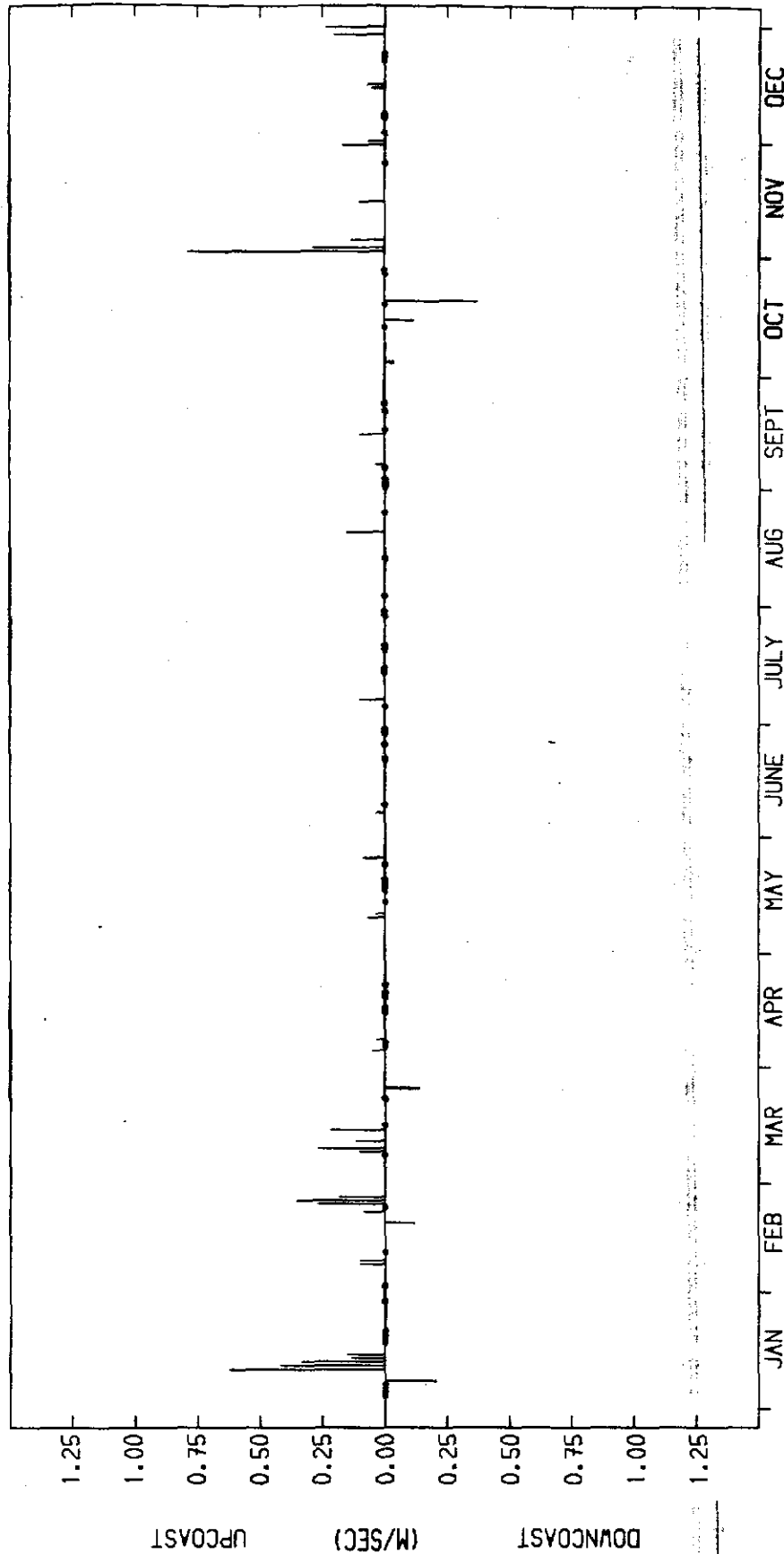
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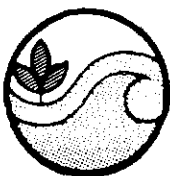
LITTORAL CURRENT SUMMARY - 1982

MEAN VEL = .051 M/SEC (UP)

MEAN UPCOAST VEL = .177 M/SEC

MEAN DOWNCOAST VEL = .161 M/SEC

MORNING OBSERVATIONS - (102 RECORDINGS)



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LITTORAL CURRENTS - MORNING 1982

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38

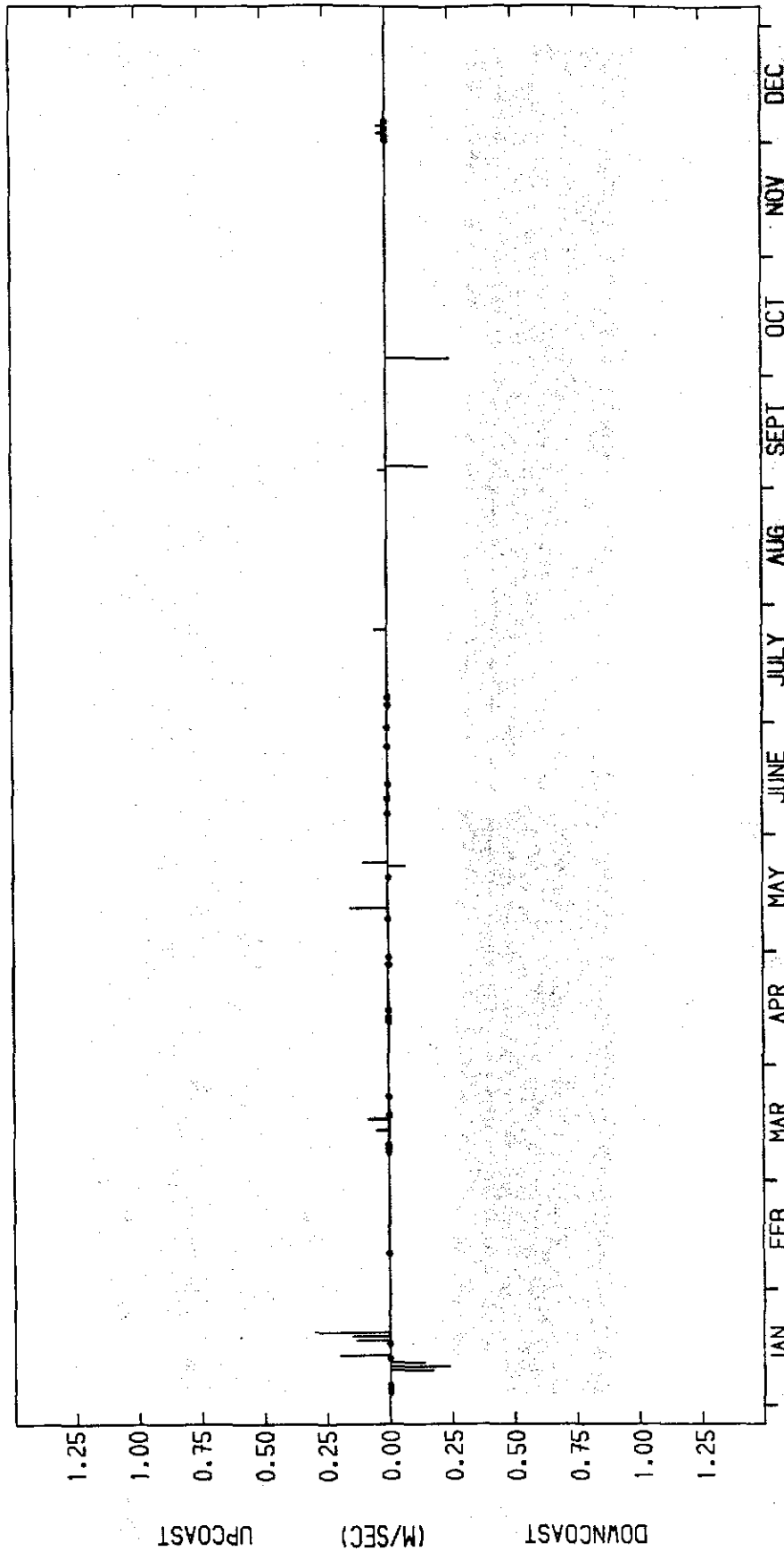
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LITTORAL CURRENT SUMMARY - 1983

MEAN VEL = .007 M/SEC (UP)
MEAN UP/COAST VEL = .104 M/SEC
MORNING OBSERVATIONS - (48 RECORDINGS)

MEAN DOWN/COAST VEL = .169 M/SEC



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LITTORAL CURRENTS - MORNING 1983

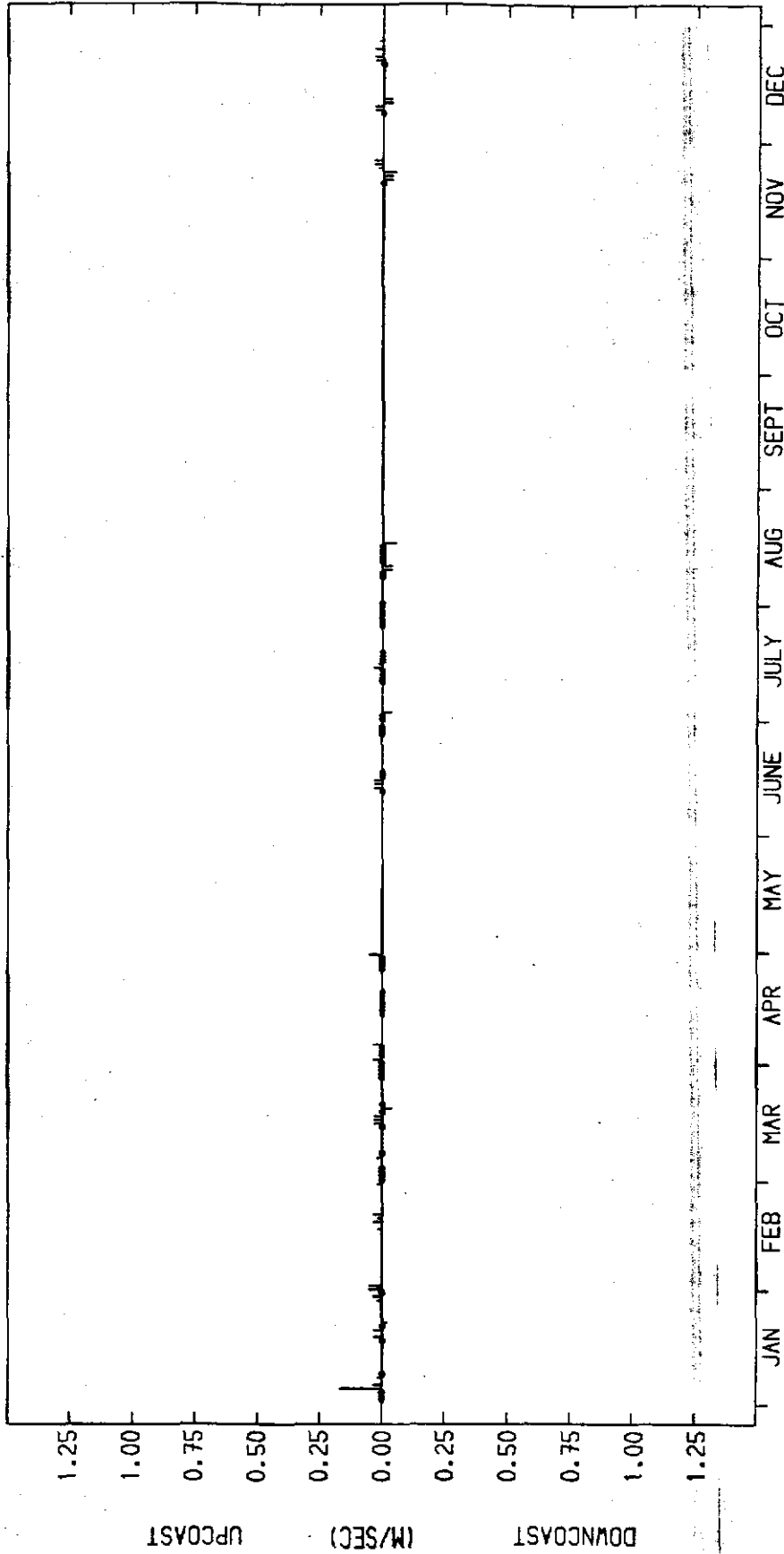
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LITTORAL CURRENT SUMMARY - 1984

MEAN VEL = .007 M/SEC (UP) MEAN UP/COAST VEL = .034 M/SEC MEAN DOWN/COAST VEL = .035 M/SEC
MORNING OBSERVATIONS - (112 RECORDINGS)



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LITTORAL CURRENTS - MORNING 1984

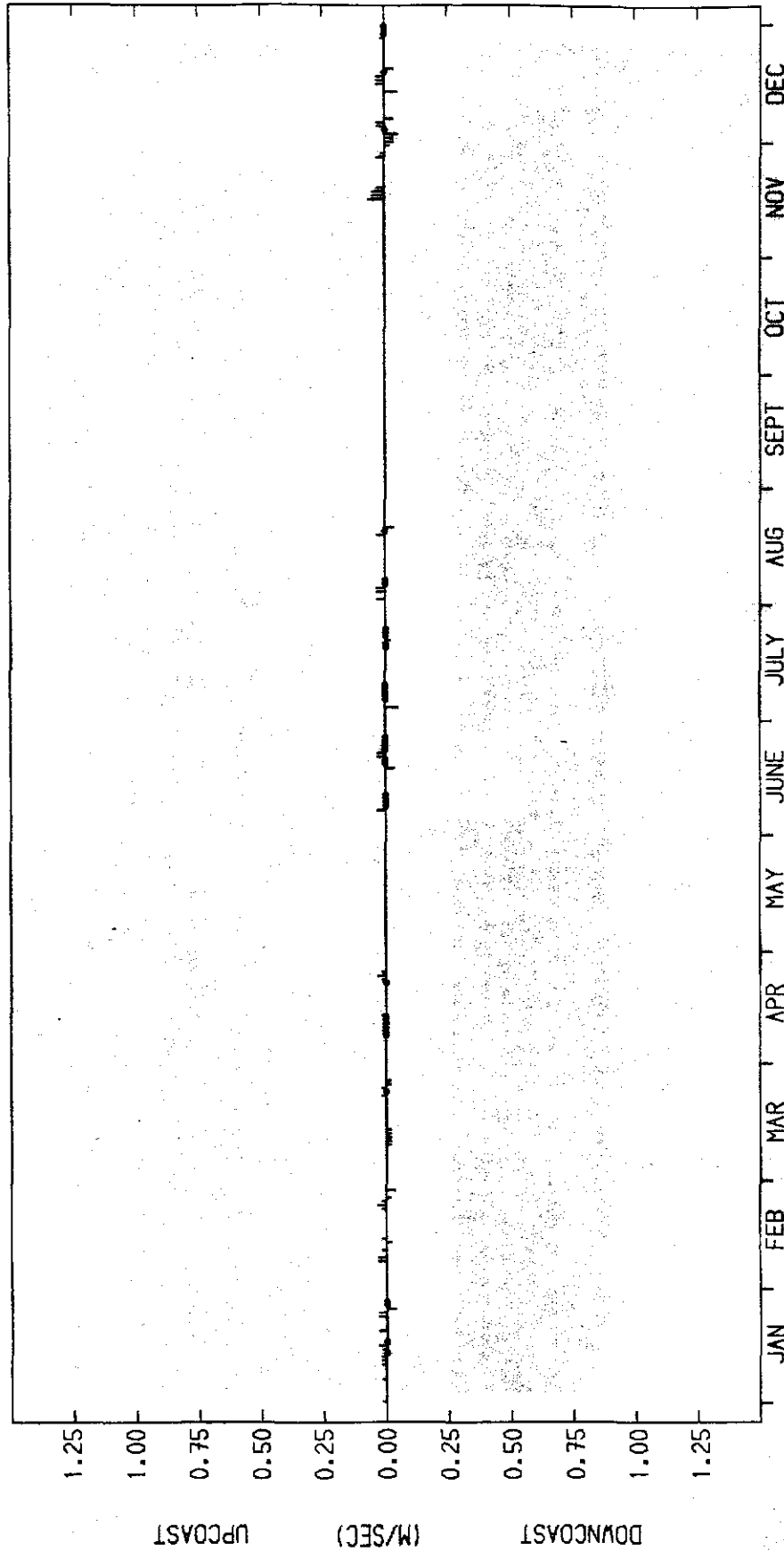
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LITTORAL CURRENT SUMMARY - 1984

MEAN VEL = .006 M/SEC (UP)

MEAN UPCOAST VEL = .028 M/SEC

MEAN DOWNCOAST VEL = .027 M/SEC

AFTERNOON OBSERVATIONS - (103 RECORDINGS)



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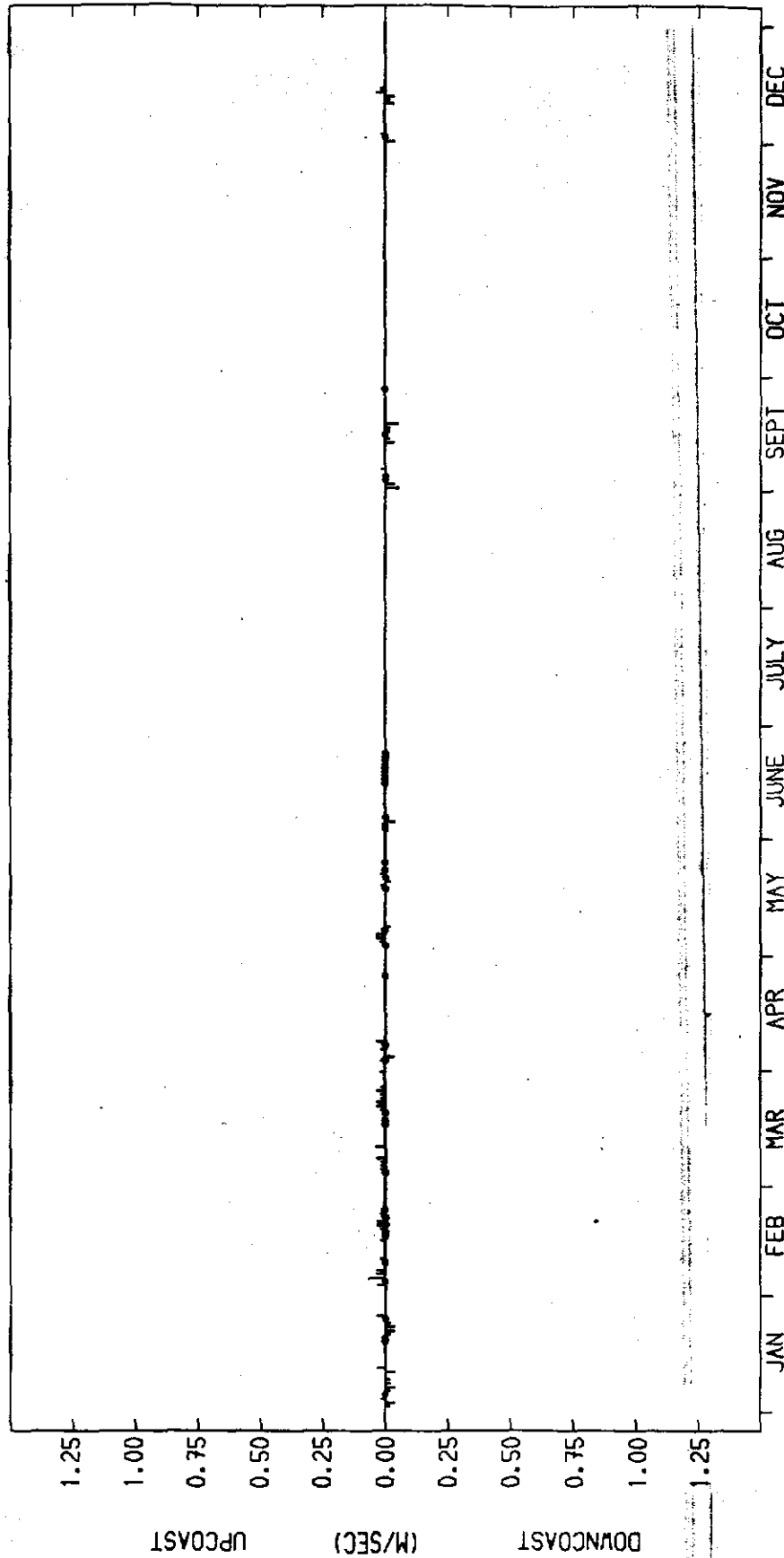
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LITTORAL CURRENT SUMMARY - 1985

MEAN VEL = .002 M/SEC (UP)

MEAN UP/COAST VEL = .025 M/SEC

MEAN DOWN/COAST VEL = .027 M/SEC

MORNING OBSERVATIONS - (105 RECORDINGS)



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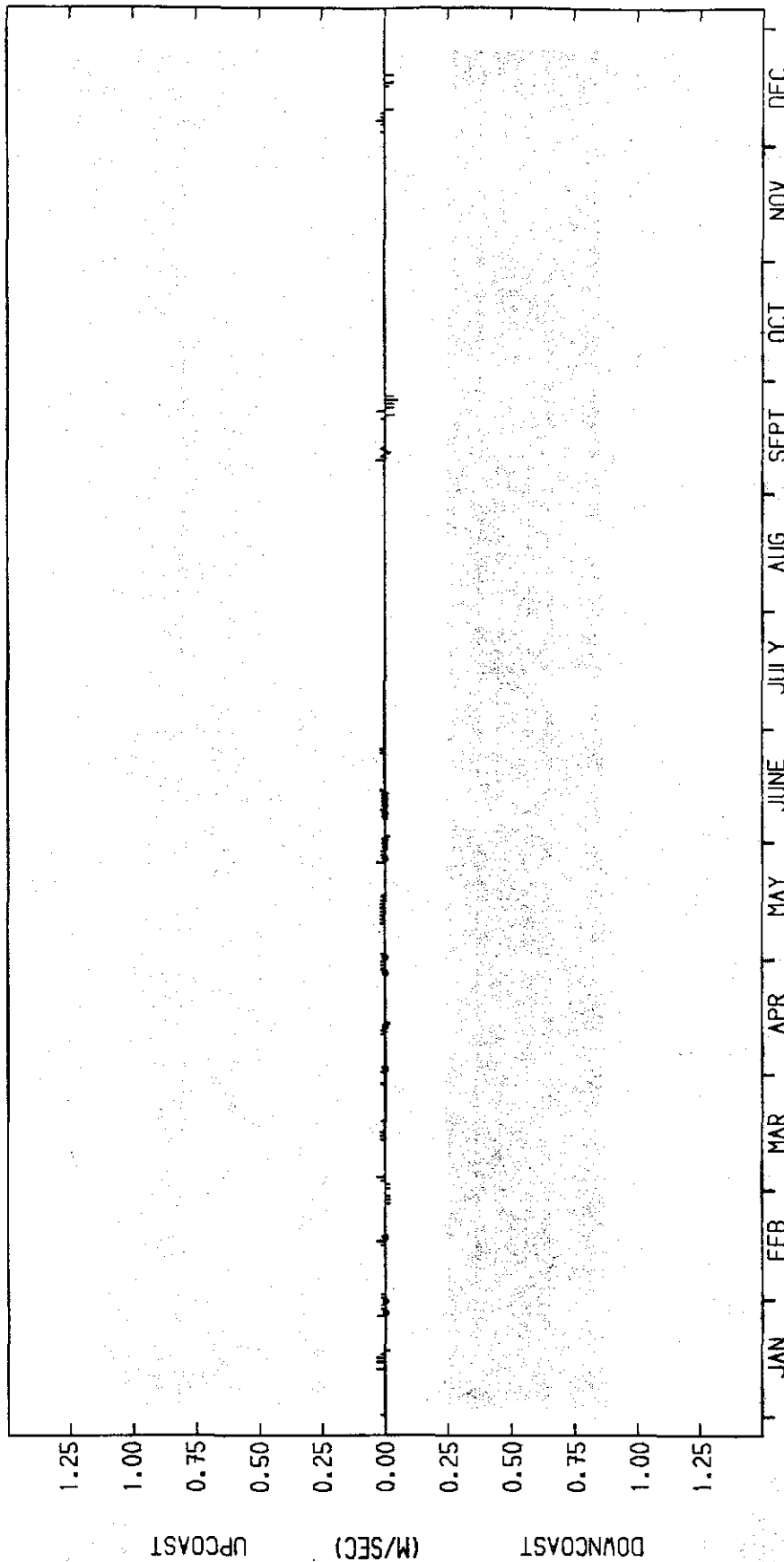
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LITTORAL CURRENT SUMMARY - 1985

MEAN VEL = .007 M/SEC (UP)

MEAN UPCOAST VEL = .020 M/SEC

MEAN DOWNCOAST VEL = .025 M/SEC

AFTERNOON OBSERVATIONS - (86 RECORDINGS)



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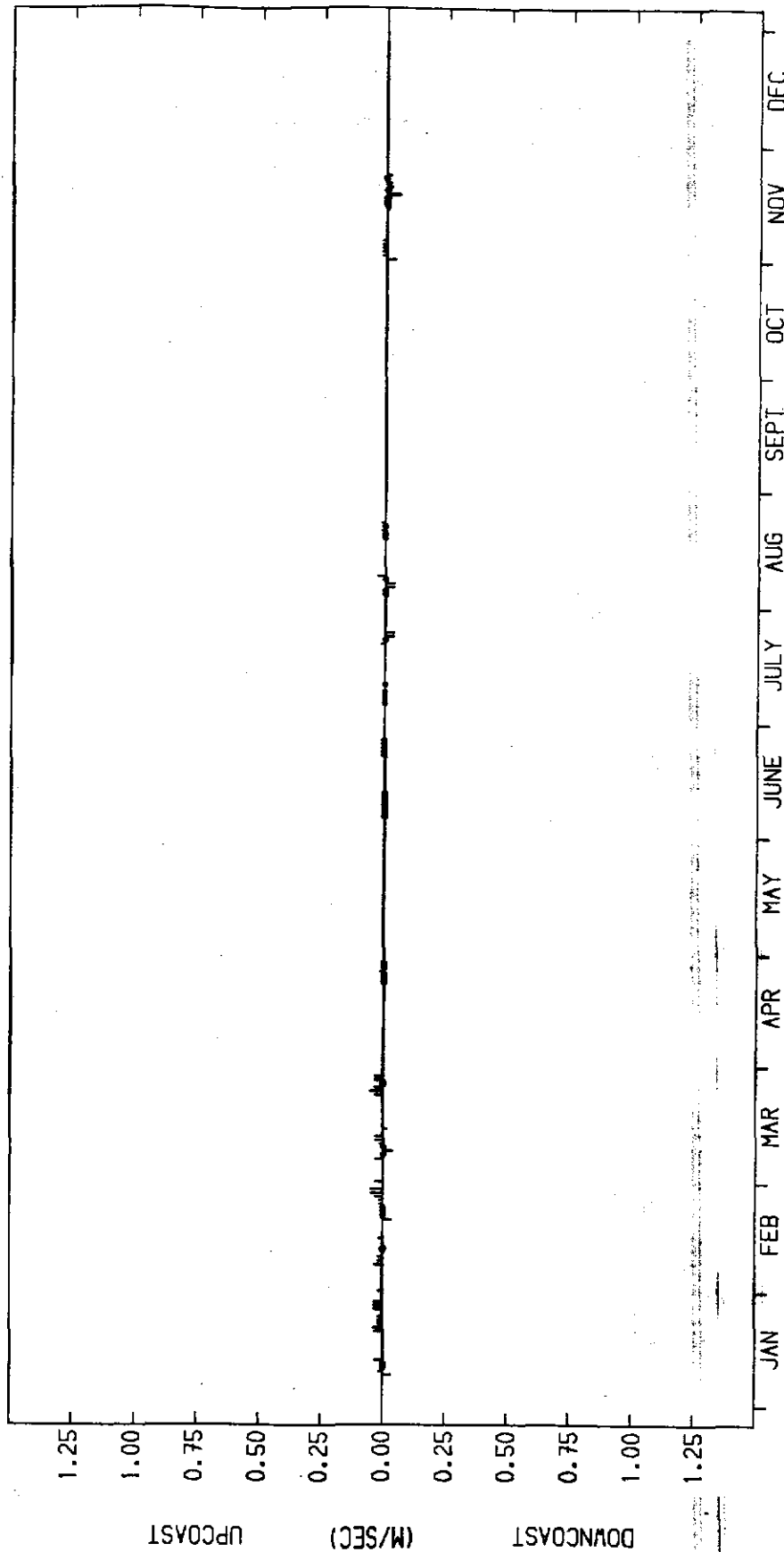
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LITTORAL CURRENT SUMMARY - 1986

MEAN VEL = .007 M/SEC (UP)

MEAN UPCOAST VEL = .026 M/SEC

MEAN DOWNCOAST VEL = .029 M/SEC

MORNING OBSERVATIONS - (96 RECORDINGS)



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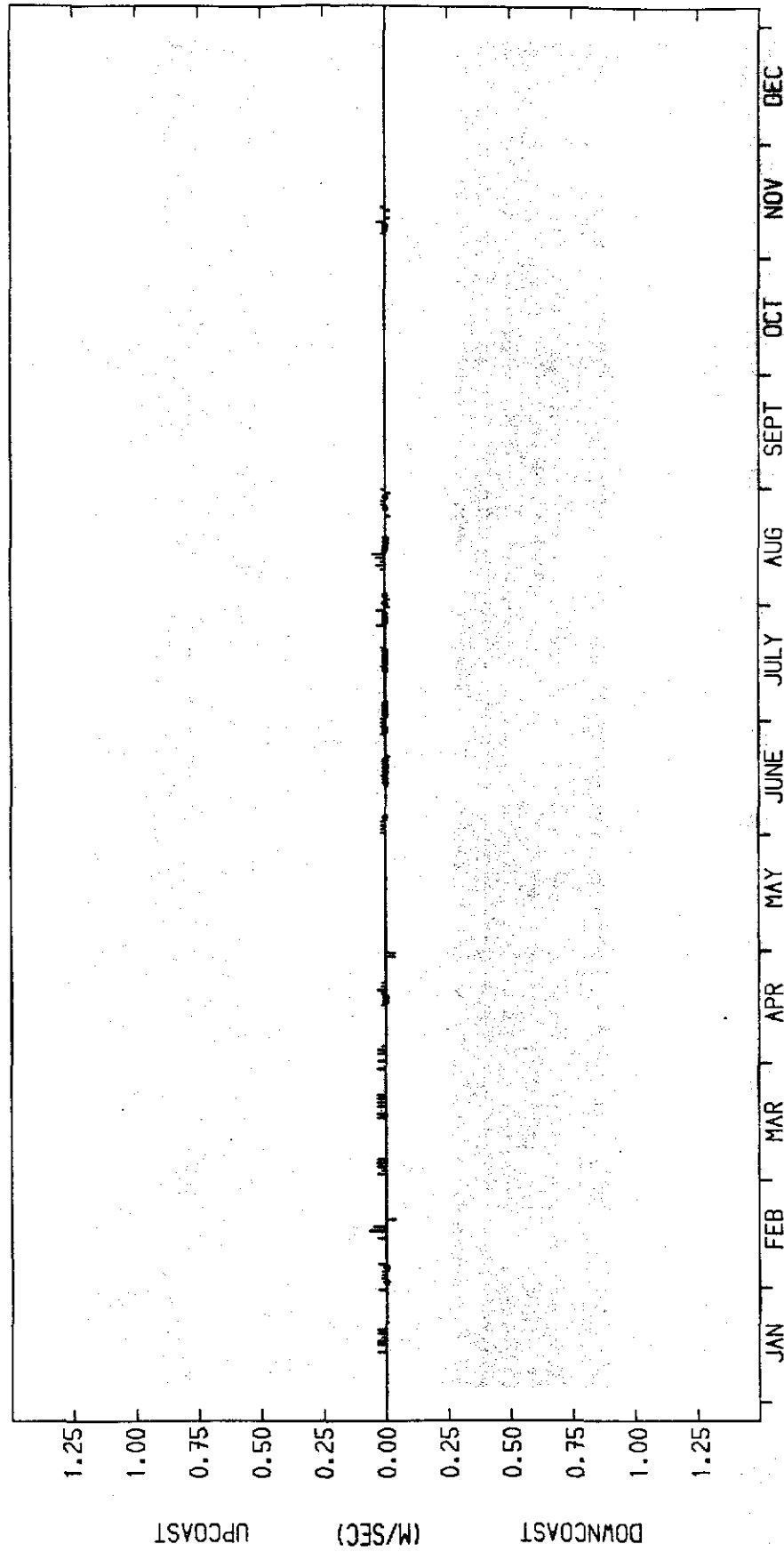
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LITTORAL CURRENT SUMMARY - 1986

MEAN VEL = .013 M/SEC (UP)

MEAN UPCOAST VEL = .027 M/SEC

MEAN DOWNCOAST VEL = .022 M/SEC

AFTERNOON OBSERVATIONS - (1103 RECORDINGS)



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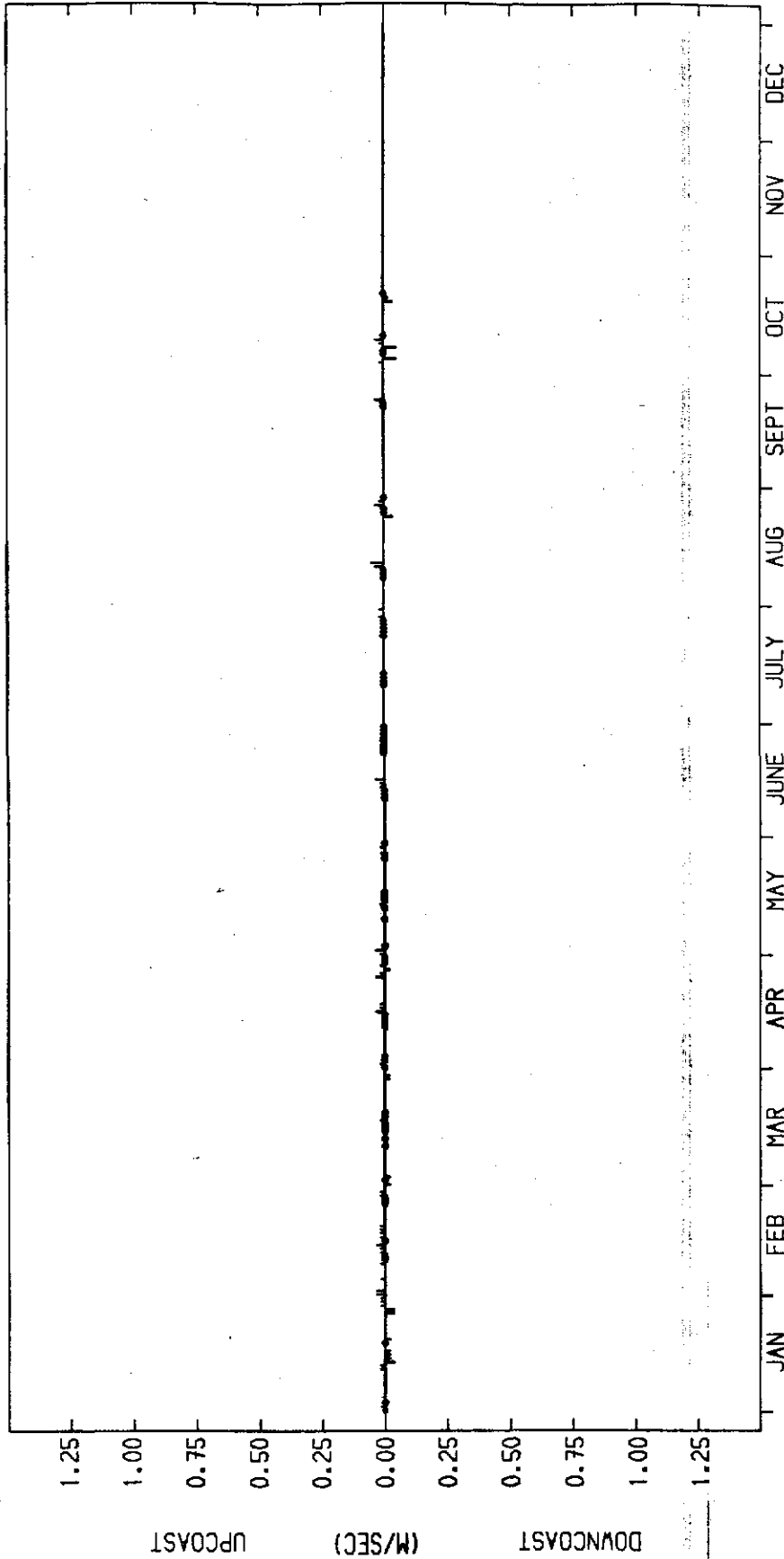
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LITTORAL CURRENT SUMMARY - 1987

MEAN VEL = .004 M/SEC (UP) MEAN UP/COAST VEL = .022 M/SEC MEAN DOWN/COAST VEL = .025 M/SEC
MORNING OBSERVATIONS - (127 RECORDINGS)



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LITTORAL CURRENTS - MORNING 1987

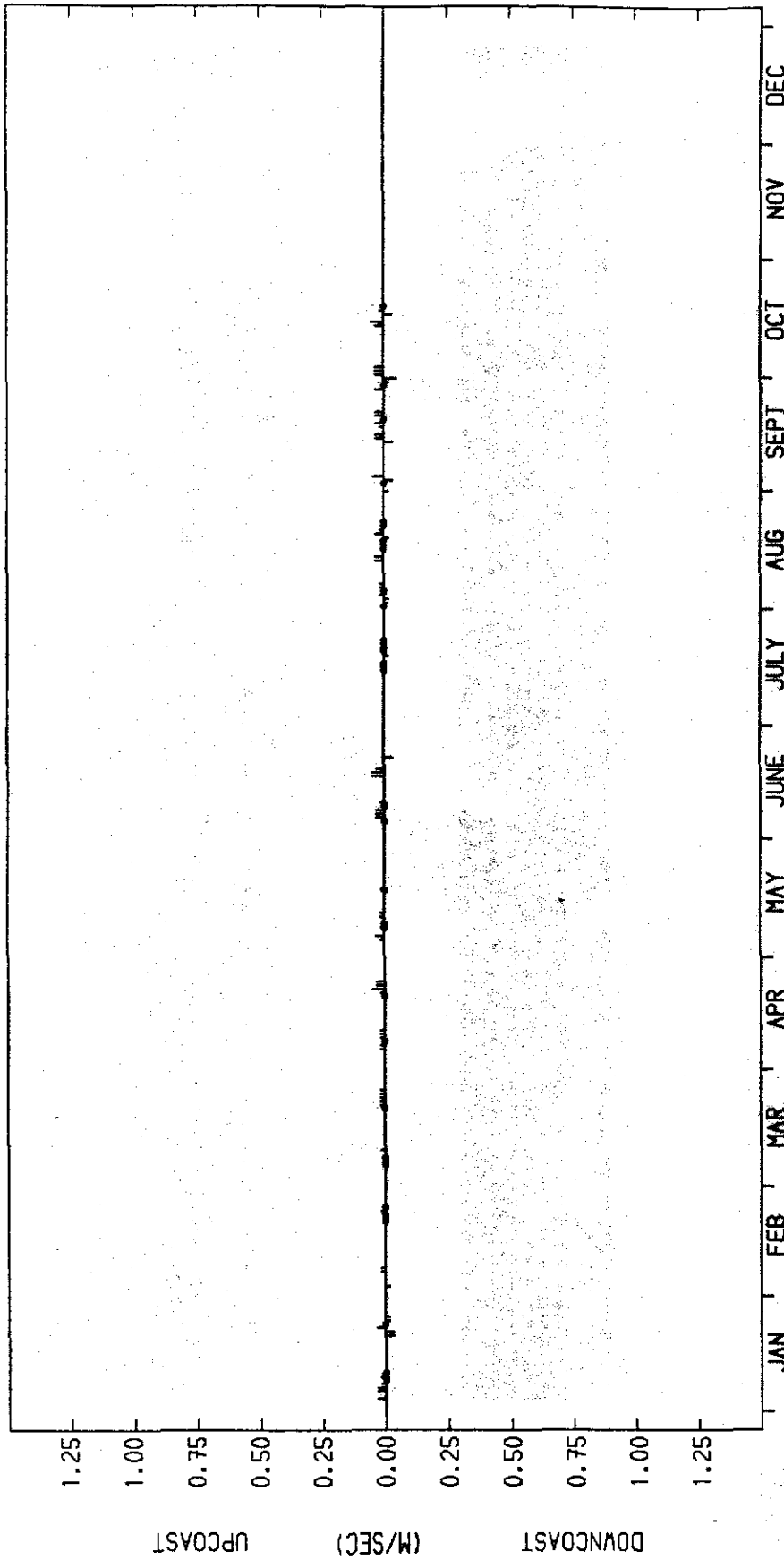
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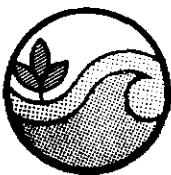
LITTORAL CURRENT SUMMARY - 1987

MEAN VEL = .010 M/SEC (UP)

MEAN UPCOAST VEL = .027 M/SEC

MEAN DOWNCOAST VEL = .025 M/SEC

AFTERNOON OBSERVATIONS - (108 RECORDINGS)



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LITTORAL CURRENTS - AFTERNOON 1987

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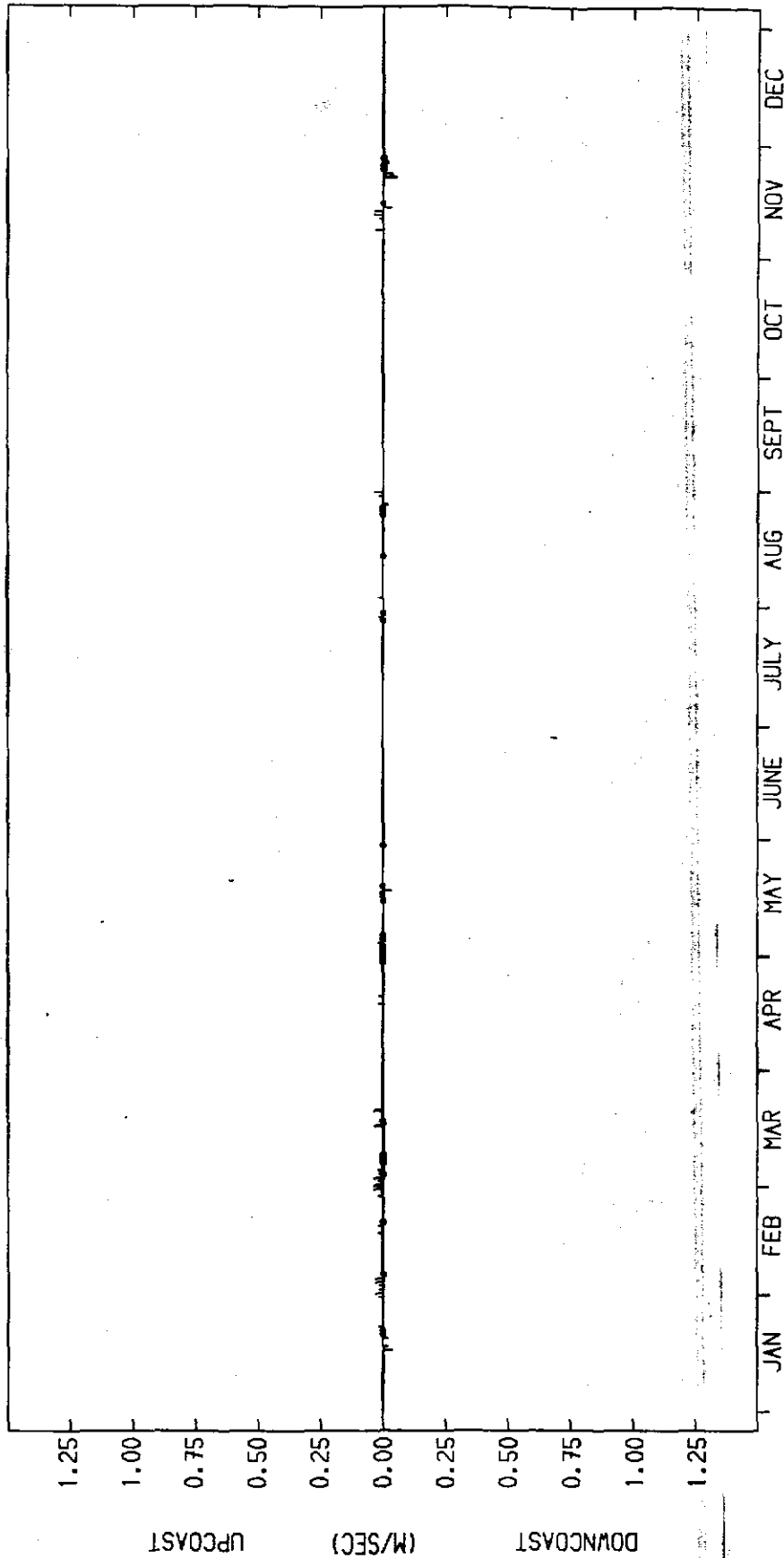
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LITTORAL CURRENT SUMMARY - 1988

MEAN VEL = .006 M/SEC (UP)

MEAN UP/COAST VEL = .024 M/SEC

MEAN DOWN/COAST VEL = .028 M/SEC

MORNING OBSERVATIONS - (68 RECORDINGS)



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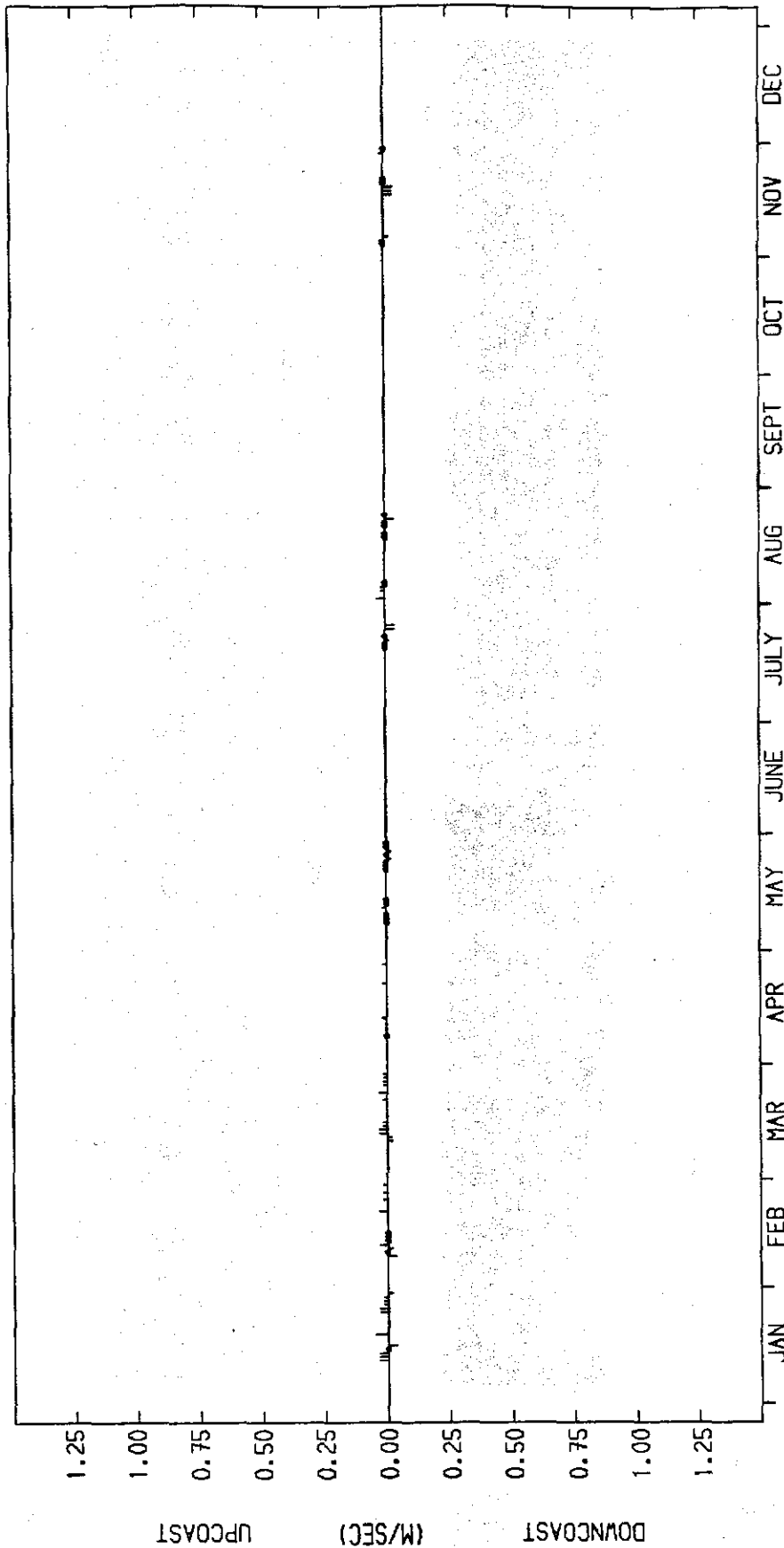
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LITTORAL CURRENT SUMMARY - 1988

MEAN VEL = .005 M/SEC (UP) MEAN UP/COAST VEL = .023 M/SEC MEAN DOWN/COAST VEL = .025 M/SEC
AFTERNOON OBSERVATIONS - (79 RECORDINGS)



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